

Conceptual Site Model

Groundwater Contamination Plume

Central Wire Plan Union, Illinois

May 2008

Prepared for:

Central Wire Company 6509 Olson Road Union, Illinois 60180

Prepared by:



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INTRODUCTION

Matrix Environmental, Inc. (Matrix) was retained by Techalloy, Inc, a Division of Central Wire LLC, to update the Conceptual Site Model (CSM) related to the occurrence of chlorinated solvents (volatile organic compounds; VOCs) in the groundwater at the company's Union, Illinois site. A CSM was previously prepared as part of the RCRA Facility Investigation report that was submitted to U.S.EPA in 1996 and Corrective Measures Study report that was submitted in 1997.

A groundwater extraction and treatment system was installed downgradient from the plant in 1997 for extraction well #1 and 1998 for extraction well #2. In 2007, it became apparent that VOCs had migrated past the extraction and sentinel wells, possibly before they were installed. The extent of the VOC plume was further investigated in early 2007, and additional groundwater sampling is planned for 2008 to further define the extent of the plume. The objectives of the updated CSM are to:

- Compile and evaluate data relevant to the occurrence and migration of VOCs in groundwater downgradient from the plant, especially including data obtained since the RFI and CMS reports were prepared in the mid-1990s.
- Provide a revised conceptual overview of the system that controls VOC occurrence and migration in groundwater.
- Identify data gaps.
- Assist the planning of additional investigative tasks as needed to resolve questions about VOC occurrence and migration in groundwater, and potential receptors, as needed to protect human health and the environment.

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BACKGROUND

Techalloy is located in Section 4, T43N, R6E of McHenry County, IL (Figure 1) at 6509 Olson Rd., just east of the Village of Union corporate limits. The property is the site of an operational metal manufacturing plant.

The Techalloy plant was built in 1959 (Buildings 1 and 2 originally) and stainless steel processing operations began in 1960. At the time, the process included cleaning finished wire with trichloroethene with rags, by hand. As the business grew, by the mid 1960s and 1970s vapor degreasing and dip tanks were used for cleaning larger amounts of wire. In the 1970s and early 1980s, 1,1,1-trichloroethane was used for cleaning and was deemed to be safer for the employees. Spent trichloroethene and 1,1,1-trichloroethane were disposed on a concrete evaporation pad located approximately where the north wall of Building 12 is now. Trichloroethene was used at the site until the early 1980s.

In 1990, the Techalloy Union Plant was in the process of being sold. It was and is standard practice to conduct a Phase I Environmental Site Assessment (ESA) to determine if there were any unknown environmental liabilities that could impact the future owner. The Phase I ESA determined that there was the potential for environmental impact from site activities. As a result, a Phase II ESA was conducted which included the collection and analysis of environmental samples. The samples confirmed that groundwater contained VOCs. This finding led to an Order on Consent with the U.S.EPA resulting in Techalloy conducting a RCRA Remedial Facility Investigation (RFI) and a Corrective Measures Study (CMS) to delineate the extent and impact from the VOCs in groundwater.

The selected corrective measures included the construction and operation of a groundwater extraction and treatment facility to intercept the VOC plume, treatment of the groundwater by air stripping and discharging the treated water to the South Branch of the Kishwaukee River. The system was installed in 1997 and enlarged in 1998 with the addition of a second extraction well and a second stripping system. It has been treating groundwater since that time. In 2001, an air sparging and soil vapor extraction facility was constructed to remove VOCs from soil in the source (plant) area.

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SECTION 3 HYDROGEOLOGIC SETTING

As discussed in the RFI and CMS reports, McHenry County is covered by glacial till deposits that are interspersed with area of outwash. The Techalloy facility and surrounding area are underlain by outwash, which is in turn underlain by the Marengo Till and bedrock units as summarized below.

Generalized Geologic Profile

Depth Interval, ft.	Geologic Unit	Source	
0 - 35 0 - 85	Glacial Outwash Sand and Gravel	Test Borings, this project	
85 – 115	Marengo Till Silty Clay	Test Borings, this project	
115 – 360	Ordovician Maquoketa Fm. Shale, lesser amounts of dolomite	County well drilling records, literature	
360 – 700	Ordovician St. Peter Fm. Sandstone	County well drilling records, literature	

Drilling has shown that the outwash is about 35 feet thick beneath most of the plant, and is about 85 feet thick beneath the northwest corner of the plant. It remains about 85 feet thick throughout the study area, northwest of the plant. Grain size analysis indicated that, on average, the outwash is comprised of 28% gravel, 61% sand, and 11% silt and clay, and that it has an average porosity of 34%.

Water-level measurements have shown that the water table is about 9 feet deep beneath the plant. Groundwater in the outwash flows to the northwest, and the hydraulic gradient is typically 0.0015 (up to 0.0025 in some areas). Under natural flow conditions, groundwater in the outwash generally flows parallel to the South Branch of the Kishwaukee River. Shallow groundwater discharges into the river as base flow. Deeper groundwater probably discharges into the river west of the study area. In 1998, a pumping test was conducted to support the design of extraction wells. The test indicated that the transmissivity of the outwash is about 37,000 ft²/day, and that

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the hydraulic conductivity is about 490 ft/day. Based on the hydraulic conductivity, gradient, and porosity values cited above, the groundwater velocity is approximately 2 ft/day.

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VOC SOURCE CHARACTERISTICS

The VOC plume originated in the east-central portion of the Techalloy facility when it was operating as the Techalloy Company in the 1960s. During the RFI conducted in the mid 1990s, soil samples were collected from 42 test borings that were drilled in and around five solid waste management units (SWMUs). Sampling confirmed that most of the VOCs originated at a former evaporation pad, although VOCs were also found in the soil at other SWMUs. Soil and groundwater sampling have shown that the VOCs in the source area primarily include tetrachloroethene, trichloroethene, and 1,1,1-trichloroethane, with lesser amounts of the daughter products 1,1-dichloroethene, 1,1-dichloroethane, and several other compounds.

Groundwater samples have been collected in the source area since 1995 and VOC data are summarized in Table 1. The locations of the monitoring wells and the 2007 geoprobe samples are shown in Figure 2.

Figure 3 shows concentrations of key VOCs in monitoring well MW-4, which is located in the north-central part of the facility just downgradient from the former evaporation pad. The figure shows that concentrations of the primary VOCs have declined substantially in groundwater in the source area, presumably in response to source elimination, active remediation, and natural degradation. Since groundwater monitoring began in 1995, VOC concentrations in the source area have been well below 1% of the solubility concentrations, indicating that dense nonaqueous phase liquids (DNAPLs), if present at all, have not been widespread. It is possible that small, discontinuous amounts of DNAPLs were once suspended in pores by capillary action, but the concentrations and distribution of VOCs in the source zone are not indicative of a large DNAPL mass.

As discussed above, an air sparging and soil vapor extraction facility was constructed the source (plant) area in 2001. In 2003, the unit removed 413 lbs. (~ 41 gal.) of VOCs and removal has progressed to the point that only 88 lbs. were removed in 2005. Central Wire believes the source area has been effectively remediated based on samples collected from the soil vapor

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extraction/air sparging system. This will be verified by sampling that is planned for 2008, as discussed in Section 7.

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VOC EXTENT AND MIGRATION

Monitoring wells have been installed up to one mile northwest of the facility. Sampling has shown that VOC concentrations decrease substantially with distance downgradient, and that they are spatially variable, both laterally and vertically. VOC data are summarized in Table 1. As in the source zone, most locations downgradient from the plant have shown a marked decline in VOC concentrations since active remediation began in 2000, although not all of the wells have had a consistent trend. The general decline in VOC levels is consistent with a mature, relatively stable plume with source elimination and remediation in the source zone. The chlorinated solvent plume is shown in Figure 4

In the source area, VOC concentrations have been higher in the shallow part of the outwash than in the deeper part (e.g., monitoring well MW-5). However, in downgradient wells VOC concentrations tend to be higher in the middle to lower parts of the outwash, from 50 to 85 feet deep. The change in the vertical distribution is not believed to be due to density effects because all of the VOCs downgradient from the plant occur either in the aqueous or solid (adsorbed) phases. Higher concentrations may occur in the deeper part of the outwash due to one or more of the following reasons:

- There is a downward gradient in the outwash in response to well withdrawals, including the Techalloy extraction wells and irrigation wells.
- The hydraulic conductivity of the outwash may be higher with depth.
- Groundwater recharge may dilute VOC concentrations in the shallow zone.

There has been some differentiation of VOC compounds with increased distance from the plant, which can be attributed to biodegradation and adsorption. For example, the compound 1,1,1-trichloroethane degrades into the daughter compounds 1,1-dichloroethene and 1,1-dichloroethane. The proportions of the two daughter compounds increases with distance from the plant, relative to the sum of the three compounds, as shown below. Each of the percentages

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represents the mean of the ratios that occurred in 2007 samples. A diagram showing the degradation products of Trichloroethene and 1,1,1-Trichlorethane is provided as Figure 5.

1,1,1-Trichloroethane Daughter Compounds Versus Distance Downgradient

Location	Distance from Plant, ft.	Daughter Compound Fraction
MW-7	700	6%
Extraction Wells	4000	34%
DGW - I	5300	36%
GP-3	7000	38%

At each location there has been not consistent change in the proportions versus time, which reflects the fact that the plume was relatively mature before sampling began in the 1990s.

As the VOCs have been transported to the northwest they have been adsorbed to the outwash, effectively slowing the transport rate. The relative velocity (v_R) of the compounds can be expressed as:

$$v_R = _C / v_W = 1 / [1+(d_B/n)(K_d)].$$

where:

 v_C = chemical transport velocity.

 v_W = groundwater velocity (discussed in Section 3).

 d_B = bulk density

n = porosity

 K_d = partition coefficient = $K_{oc} * f_{oc}$

 K_{oc} = Organic carbon partition coefficient.

 f_{OC} = organic carbon fraction.

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Table 3 indicates approximate <u>relative</u> transport rates for five VOCs at the site, based on compound-specific K_{OC} values and other assumptions as shown. Of the five compounds listed, the daughter compounds of 1,1,1-trichloroethane (1,1-dichloroethene and 1,1-dichloroethane) have the highest relative velocities, which is consistent with the fact that they are found in higher proportions downgradient, as discussed above. It is likely that the differentiation of VOCs that has been observed downgradient from the plant is a result of both biodegradation and differing transport velocities.

Between 1998 and 2002 there appears to have been migration of VOCs past the sentinel wells (the DGW well nest discussed above) that are located northwest of the extraction wells (Figure 3, Table 1). Based on these findings, additional groundwater sampling was conducted in 2007 to redefine the end of the plume. Figure 3 shows the location of six Geoprobe locations, GP-2 through GP-7. Groundwater samples were collected at three depths in Geoprobe boring. The results are shown in Table 3. Five VOCs were found in samples from borings GP-2, GP-3 and GP-5, and concentrations of 1,1-dichloroethene exceeded the MCL in one of the borings (GP-3). VOCs were not detected in the other borings.

The relative velocities are stressed above because the calculations include default soil parameters, not site-specific ones. Techalloy has found that in the 47+ years after the discharge of VOCs began (1960 to 2007, when Techalloy relocated the end of the plume), the compounds have been transported 1.3 miles downgradient (source area to GP-5), or 145 feet per year. If the rate is linear, it will take 13 to 14 more years for VOCs to reach the closest potable water well, which is approximately 0.36 mile further downgradient than GP-5.

As noted above, Techalloy is working with EPA and plans to determine the end of the plume again in 2008, to confirm the rate of plume movement.

POTENTIAL EXPOSURE

Human exposure could potentially occur via ingestion, inhalation or adsorption. Ingestion has the highest exposure potential via potable well water. The area downgradient from the plant is primarily agricultural (Figure 1). Since 2006, Techalloy has routinely sampled private wells located near the corner of Non-responsive

There is also a side gradient well on Highbridge Road (the Non-responsive

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2002. Residential well sampling has shown no VOCs in any of the samples collected to date. There are five homes and a nursery located closer to the sentinel wells along Illinois Highway Route 176. Wells at the homes and nursery were sampled in March 2008 and no VOCs were detected in any of the samples. These five homes will be sampled again in June for verification.

Since the late 1990s there has been a substantial reduction in VOC levels in the source area and downgradient from the plant, and the remediation systems are continuing to operate. However, the fact that low VOC concentrations have been found northwest of the extraction wells means that some uncertainties remain about the extent of VOCs and potential exposure. VOCs have migrated beyond the sentinel wells (DGW), possibly before those wells were installed.

Since this situation was discovered, Techalloy has prepared two groundwater models to help evaluate the VOC plume. The models simulated groundwater flow and included the hydraulic effects of the two Techalloy extraction wells and the two Central Sod irrigation wells. Both of the models were run with conservative assumptions favoring the migration of VOCs. The models suggest that the front of the plume has reached a semi-stagnant region on the downgradient side of the capture zone created by the Techalloy extraction wells. Both of the models suggest that the VOCs will dissipate and /or degrade before they are transported as far as Illinois Highway Route 176. Although the modeling results provide some assurance that the situation does not pose a risk of exposure to VOCs, uncertainties remain as discussed in the following section.

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DATA GAPS AND SCOPE OF WORK

In order to further evaluate potential exposure, additional information is needed about the extent of VOCs in groundwater and the mobility of individual compounds. In particular, additional information is needed in the area northwest of the DGW monitoring wells. In 2008, Techalloy plans to conduct a field investigation to define the leading edge of the VOC plume and to monitor the rates at which VOCs are migrating and degrading. Techalloy will then use this information to determine if and when the plume will reach any supply wells and determine the most effective mitigation actions, if necessary. As noted above, it appears that it will take 13 to 14 years to reach the closest potable wells assuming the modeling efforts undertaken are not correct and the expected dissipation and degradation does not take place.

The investigation will include the drilling of additional Geoprobe borings at the following locations (see Figure 3):

- Southwest corner of the Non-responsive property, just Non-responsive of the Techalloy property and abutting the Non-responsive (PROP 1).
- In the Non-responsive Road right-of-way ROW) on the western boundary of the property (PROP 2).
- Union Road ROW at the Techalloy Groundwater Treatment Plant (PROP 3).
- South of the DGW monitoring wells, on the property line (PROP 4).
- Just west of former Geoprobe boring GP-2 (PROP 5).
- Just south of former Geoprobe boring GP-6 (PROP 6).
- East of former boring GP-7 (PROP 7).
- Across (northeast of) the South Branch of the Kishwaukee River, in the Union Rd. ROW (PROP 8).

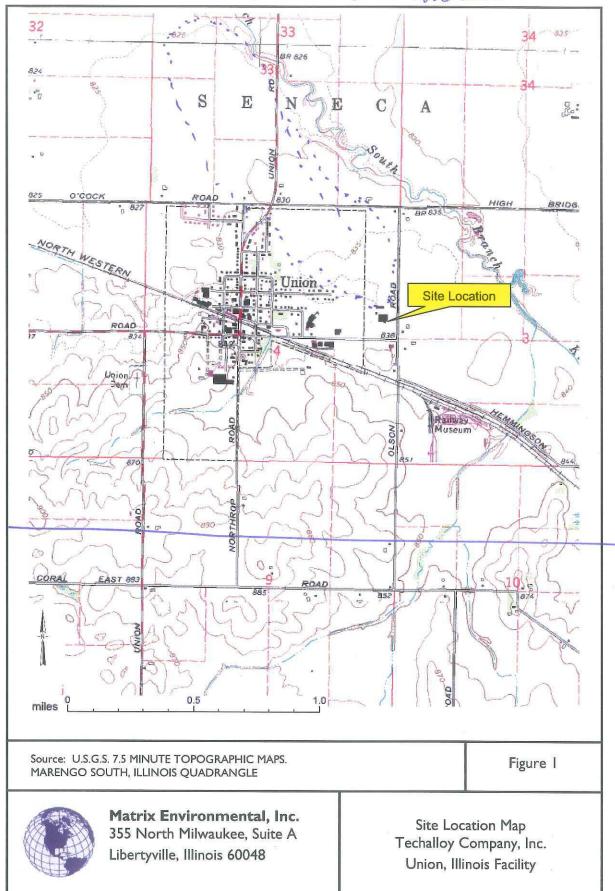
In the source (plant) area, Techalloy will sample soil at various locations to determine if any residual soil contamination exists.

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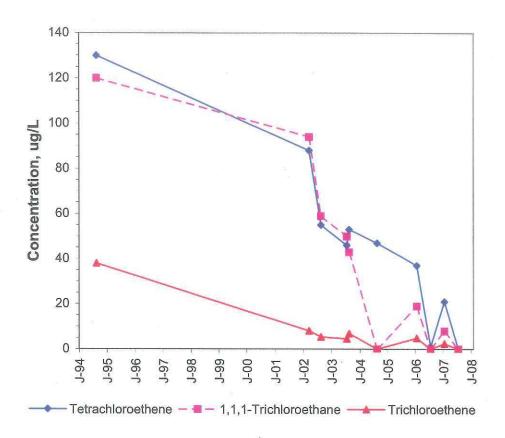


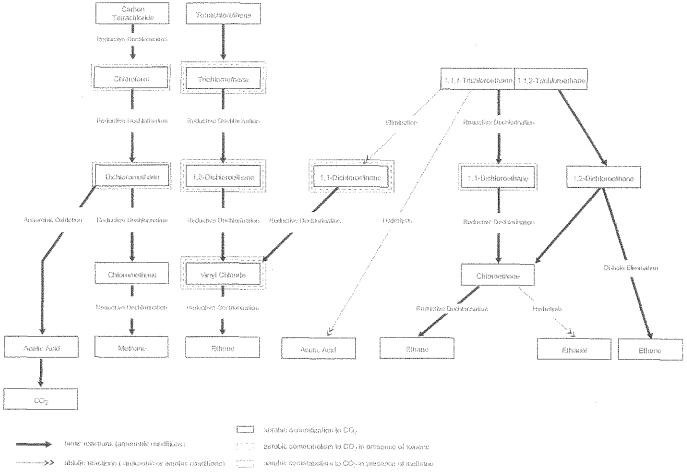
FIGURE 3
VOC Concentrations in Source-Area Monitoring Well MW-4

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Figure 6 : Common Degradation Pathways



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Table 1 Central Wire Company Union, Illinois June 2006 Groundwater Samping Volatile Organic Compound Results

		Monitor	ing Location	Crack 4	004-1-2	C 1	A = -	0 0		MV	V-2	i - 2							100			MW-	4			_	
		Sar	ngling Date:	1-95	A-02	J-03	D-03	1-04	J-05	Jn-05	D:05	Un-06	D-06	Jn-0?	D-07	MA-GB	J-95	A-02	J-03	D-03	J-04	J:05	Jm-86	D-06	Jn-07	D-07	M-09
Parameter	Method	Units	MCL							10 3		8 0															-
Vinyl Chloride	82603	ap/L	2							1 -2 1	340	0.0		Tett	100	S 1							25	525		648	2
Chlosgetkane	8260B	sigit.	-	45	2.1	(2)		-		-		1 2 1		- 22		1.0		1.2		1 770	17.0	-			7 7 7	100	
1,1-Dichloraethene	82608	Jon	7	26			2.4		-		1.16	S V	-				7.1	2.3				-	-	-	-		2.2
Mathylene chloride	82668	uc/L				-	-		148	7.2	4.		- 6		1	-		-	-			-	-		-		- 44
lotal 1.2-Dichlorpethono	82605	HOH	170	58	16	16	9.8	3.5	2.3		4.31			1.3			18	2			1	-	-	5.4	-	-	14
1,1-Dichloroethane	82606	ao/L	900	65	43	20	10	5.2	43	19	5.21	-	10	1.2		-	32	27	21	77	5.6	1.5	2.6	1.3	_	-	8.2
1,1,1-Trichleroethane	82608	up/L	200	510	50	R3	90	20	7.7	33	21.8	6.5	8.6	3.9			120	94	59	50	43	1.0	19	1.3	- 0	1	45
1.2-Dichlorgethane	82665	not.	- 5	-	-	-	-	-		-	-	-		1.2	100	-	14.0	27	- 39	- 40	- 44		100	35		1	
Trichloronthene	82608	unit.	5	23	0.2	9.5	9.9	2.5	14	-	3.05	-	1.6	1.4	1.5	_	30	8.1	5.4	4.6	6.9	-	4.9		2.4		6.5
Toluene	8260B	apt.	1000	-	0.2					-	3.00	-	1.0	110	1.0	-	30	0.1	2.4	4.0	2.9	-	9.9	-	2.4	100	
1.1.2-Trichlomethane	82603	not	5	7 27				1	-	7 70			-				-	-	-		4.5	15			- 3 -		
Tetrachiornethens	82605	pot	- 5	42	57	39	65	19	15	10	22.3	30	29	7.0	5.3	2.1	130	RR.	55	46	53	47	37	1.0	21		29
total Xylones (m.o. & p)	82608	yig/L	10,000	17			-	-	72	- 10				- 1.5	0.0	4.1	1.10		90	40	00	nr.	- 31	1.0	21	-	20
III COMO SERVICIO CARROLLO		- 2200															-	-			-				-		
			ing Location								V-2	Mantagara		a constant		roct is send	E	B-74/5-2110	3 000000	V2-141	reining o	MW	4	2 1 1 1 1 1 1 1 1	Acres at the		
	30000		mpling Date:	1-95	A-02	J-03	D-03	1-04	J-05	Jn-05	D-05	Jn-06	D-06	Jn-07	D-07	M-08	J-95	A-02	1-03	D-03	1.04	J-05	Je-06	D-05	Jn-07	D-07	14-08
Parameter	Method	Units	MCL																						-		_
Mercury	7470A	ugL	2	. 35	121	(*)	-	•	199	- 22	3-3	- 25	**	(• (·	-0.50				1 30	0,620	3.5		4 4		A (*)		-
Arsenio	6010B	ingiL	0.01	10000		V . (*)			-57438	0.00		Calenti							Sections	0.016							0.004
Barlum	6016B	mgiL	. 2	0,025	0.037	0.027	0.045		0.028	0.036	0.0152	0.02	0,01	0,019	0.015	0.013	0.075	0.050	0.035	0.170		0.032	0.046	0.012	8.019	0.018	0.060
Cadmium	60108	mgiL	0.005		-			•		-	(4)	-	-	(4)			-		+	0.005		-	-	-		1	0.0086
Chrotnium	6010B	mgiL	0.1		0,040	1.100	0.610	5 500	340	-	0.0013		0.022	0.0025	0.0076	0.0012	0.015	0.240	0.150	0.670	5.05	0.160	0.130	0.0023	0.044	0.015	0.510
Lead	60105	mg/L	0,615	0.037	0.040	-			1000		0.011 J			0,0313	6,0116	7 - 3 - 1	0.011	0.011		0.730		-	0.015	0,0023	0.007	0.010	0.180
Salenium	6010B	trail	0.05						(+)		0.020 J	1 54 1	0.0013					-	1.0			0.024	0.801	1000		1	0.100
Silver	5010B	mgiL																									

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Table 1 Central Wire Company Union, Illinois June 2006 Groundwater Samping Volatile Organic Compound Results

		Manitari	ng Location	1507/5							MV4-5						100						1/1/2	/-SD					
		Sam	pling Date	J-95	A-02	J-03	D-03	3-04	J-05	Jr-05	D-05	Jr-06	D-06	Ja-07	0.07	M-08	4.95	A-02	1.03	D-83	J-84	J-05	Jp-05	D-05	Jn-05	D-06	Jn-07	D-97	8.6,159
Parameter	Method	Units	MCL						0 0															-		2.32		-	
Vinvi Chloride	82603	149/L	2			10	5 -		4 3	1000			-	7 - 7							- 1		200	255	100	100	0.00	04	1 3
Chloroethann	82608	ug/L	100	777	12	-		4.7	-	720	10.7		- 27				1	100	- 3	-	-	- 2		100	-	-	100	-	- 3
1.1-Dichloroethene	82609	up/L	7	230	12	5	1.8	-		-	164	-		5.7	1.1	-		-	1.3	14	12	-	11	1.64	-	-	-	1.2	_
Methylene chloride	82609	14971	_		14	1 2	-			1.41		- 4					1	-	1.0	1				1,04	-	-		1.2	- 0
total 1.2-Distriproethese	8260B	un/L	170	70	4.4	120		-21	12.	12.5	- 20	- 12	- 121								-20				-	12	-	12	-
1.1-Dichlorgelhane	8260B	60/1	800-	59	- 11	12	200			- 1					- 2			1.8	24	26	2.6	1.9	23	3.45	22	2.1	1.5	1.6	1.3
1.1.1.Techlomethane	82605	un/L	200	4000	300	360	330	150	160	170	93.2	78	62	26	58	58	120	24	50	49	3.7	1.07	32	40.4	23	29	20	19	16
1.2-Dichioroethans	82608	up/L	- 5			-		- 100	100	110	300.2			- 00	- 30	- 50	120	- 44	- uc	74	4.7	-	OE.	40,4	- 60	- 24	20	19	16
Trichlosostiene	8260B	up/L	- 6		- 5	10	7.5	4.7	5.1	4.9	4.63	47	- 4	4.5	46	3.8	-	32	63	52	51	-	-	47.5	27	30	22	22	18
Tolunna	8260B	up/L	1000		-	14	110		0.1	4.0	4.60		-	4.0	4,0	0.0		- 01	00	92	- 01	-	1	413	61	20	- 22	11	10
1.1.2-Trichloroethane	8260B	ue/L	- 5		12				2.1	723					-	-	110	-	-	H÷.	-01	29	-	-		1.60			
Tetruchigronthene	82009	un/L	6	620	94	190	210	170	190	190	133	120	160	150	130	150	110	-	-	-	_	42	49	-	- 5	1.2	-		-
total Xylenes (m,o, & p)	8260B	µg/L	10,000	-	- 2	-			-	1.4		100	100	- 100	100	100		-	-	-		-	7.	-		12			-
- III - JOHNSON		Manited	ng Location								MW-5												123						
			pling Date:	J-95	A-02	1 1-03	D-03	J-04 I	J:05	Jn-05	D-05	Jn.os	D.OE	Jn-07	D-07	1 14-09	100	A-02	1.03	T 5 00	101	1.05		7-SD		2/22		1 2 4	
Parameter	Method	Unital	MCL.	4.00	rvuz	470.0	Dida	3.04	2-03	20410	0-93	JII-UD	D-tie:	28-67	0.07	W-03	2.93	AUUZ	1-87	D-63	J-04	1-65	Jn-05	D-05	Jn-06	D-66	Jn-07	0-67	W-08
Mercury	7470A	up/L	MUL		_	-			- 1		-	-	-	-				_	-	_	-		_						
Amenic	G010R	moll	0.01	100		-		- 6			0.0284	- 2	- 36	1.3	- 2	1000	- 5	-	-3	-			100	-					
Barlum	60108	mg/L		0.029	0.049	0.045	0.13		0.637	0.035	0.0284	-		-		-	1		100			-	-	0,018 J	100		Sugar	1.1	
Cadmium	6010B	mg/L	0.005			U.U45			0,637			0.0026	0.025	0.029	0.027	0.050	0.059		0,034	0.075		0.065	0.054		0.057	0,873	0,071	D,07E	0.064
Chromium	6010B	morL	0.005		0.017	-		-	-			- 34			400	200		1/4	- 5	- 22	- 3	- 83	235	100	1.12	-	-		
Lead	6010B	reg/L	0.015			-					-		-	0.0012	0.0059	0.0024		0.01		-	- 3		100		0.023	0.023	0.031	0,05	0.054
Selenium	8010B	mp/L	0.05		-	-		-			4 55 5 1	-	-					0,007	-	-		-	-	-		-		0.0016	-
Siver	6010B	mp/L mp/L	-	100	-	-		-		_	0.025 J	- 1			-		-	-	-			0.015	- 3	0,031,3	1.	10.	- 00	750	
			1,700			-		180	200	633	0.0821 J			-								57 65 3							-

J = Parameter detected below quantitation detection lim
 Not Detected

Noi Detector Noi Analyzo

" Region 9 PreEmissary Remediation Goal IMW Interior manitaring well (inside Technilay fence)

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Table 1 Central Wire Company Union, Illinois June 2006 Groundwater Samping Volatile Organic Compound Results

		Manitori	no Location						0-655-	MW	-6	5.5%			16		100	V	3 - 31					N	NV-7						
		San	npling Date:	J-96	A-02	J-83	D-03	J-84	1-05	Jn-05	D-05	Jr-06	D-06	Jn-07	D-07	M-09	1.95	A-02	J-03	D-03	J-04	1-05	Jn-85	D-05	J11-05	D-06	Mar 07	Jn.07	\$.07	D-87	M-D
Parameter	Memori	Units	MCL		- 0										5		V 70			- 1										1,000,001	-
Vinyl Chlaride	826#B	119/1	2		-3		- 9				1911	1	-	340							4		1/2	28	25	020	`	122	-32	1 2	-
Chloronthann	82695	ug/L	900	580	(a)	14	114	54			14		+	16		1	100	6.2		7.00	0.0	32	10 0	- 23 E	- 1	1/41			100		-
1.1-Dichlorpethene	82668	up/L	- 3		0.21		4.	12			-				8 . 3		130	22	11	5.5	23	1.9	-	1.45		-		1.1	-	1.2	
Methylene chlaride	82609	jugit					-		-	181			-				6.1			- 4.0		115	-	1.44	-		-			1.2	-
lotal 1.2-Dichloroethene	82605	untL	170		-		10.1	122		-	027			1000	12		52	13		7225		10.0	-	-	-	141		- 10	12	44	-
1.1-Dichlorpelhane	82609	60/1	800**	75410	3-81	-	54.7	-	-		- 12			- 20			140	70		7.5	24	2.1	1.9	-	12	-	12		-	3.8	-
1,1,1-Trick/orgethane	82605	140/1	200	10			1.1	-			-		- 11	-			830	440	840	630	270	210	1,0	118	77	66	59	62		34	28
1,2-Dichloroethane	8260B	up/L	51		-	-	-	- 1	950	-	-			77		- 5	21	710	20				100	110	- 17		- 37	Me		- 00	2.0
Trichloroethene	02609	107.	5			-	-		-	-		-	-	-	13	1 0	64	33	63	56	34	19	15	16	10	- 6	7.5	7.2	6.2	0.9	6.0
Tolueng	8260B	un/L	1800	7.5			-	-	-	_	-			-	1				- 00			- "	10	- 10	10	-	1,0	716	0.2	9.9	0,0
1.1.2-Trichlomethane	82608	14071	5	-	74.0		-			-	32	1 12 0	- 2					1.2		32	1.1		-	-		740			-1	-	-
Tetrachiorpethene	92609	un/l	5	36	14	10	12	9.6	9.1	9.4	9.91	7.0	7.0	67	6.4	0.5	150	84	140	200	160	180	140	140	150	200	100	170	110	110	110
total Xylenes (m,o, & p)	9280B	μg/L	10,000	(100)			-	-		-	-			-	-	1	-		140	200		-	-	-	100	200	160	100	110	110	110
	-	Marallani	ns Location						*	MW	7.6																		-		-
			npling Date:	J-95	A-02	J-03	D-03	J-04	1-05	Jn-05	D-05	Jn-05	D-06	Jn-07	D-07	I M-08	J-95	A-02		D-03	J-04		-	D.os	111-7						
Parameter	Method	Unita	MCL	4.90	A-UZ	2.03	Dies	4-04	4-03	311-03	12-03	37/1-0/6	D-ue	JIN-UT	D-ur	11-90	7-33	Avuz	1.03	D-43	24,04	1-05	Jr-05	D-05	.ln-86	D-05	Mar-07	Jn-07	\$-07	D-07	M-0.9
Mercury	7470A	up/L		1007	1020	010		7.	120	-	-	-		7920	-		-	-201		2000		-	_	0.0002J	-	-				-	
Arsenic	60108	mo/l	0.01		-	-	-	-		-	0.033	12	- 0	3-3			0.016	-			-	/*	- 7	0.00023	70.0	10000					
Parlum.	8010B	morL		0.091	0.090		0.093	-	0.073	0.072	0.033	0.054	0.072	0.07	0.087	0.079	0.016	0.050	0,061	0.049	-	0.049	0.048				-	-			
Cadmium	6010B	mg/L	0.005		0.003		0,053	-	0,0/3	nuiz	0,000	0.064	0.072					0.050			-	0,049	0,046	0.063	0.037	0.049		0.047	0.026	0.054	0.02
Chromium	6010B	most	0.003		0.003	-	-	-		-	-	- 1	-	(4)	- 1	- 25	196	0.012	(4)	(4)		- 2.5	13	- 2			100	-	-		
Lead	6010B	mg/L	0.015		0.430	0.097	0.047	100		0.010	6 5074 J	0.016	0.0004			0.040	4 200					-			0.0021	0.0335	-	0.0038	0,0066	0,014	0.01
Selenium	6010B	mp/L	0.015		0.430	0,097			0.013	0,010	0.042 J	u.016	0.0034	- 1	0.0076	0.012	0.009		0,651	-	-	-	0,009	0.019 J	0.8918	0.003		0.0028	0.0023	0.0052	0.003
Silver	60108	mp/L		-		-	-	-	0.013		0.6423	15	- 52		- 2	1000	(*)	-			-		- 11	0.033 J	0.9910	(*)		116	. 19	736	14

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Table 1 Central Wire Company Union, Illinois June 2006 Groundwater Samping Volatile Organic Compound Results

			ring Location									HBRID											JES:	SEN			_		SIAIS	,	7			MUSS			$\overline{}$			NDREW				CW	-100
		S	mpling Date	i-95	A-02	3400	3 D4	03 J4	14	J-05 J	r/65	D-DS	Jm-66	D-08	Mar-07	Jn-07	S-07	D-07	M-06	1-66	A-82	143	D-03	J-04 .	-05	-05 J	1-35 L J	⊪J8 I 3	07 I D	07 M	98 1	Jn-36	D-66	Jn-07	3-07	M-Di	Jn-C	5 C-(S Jr.	07 L S.	7 D-	7 M-	B .	In-II5 1	M-08
arameler	Methon	Units	MCL	_					\neg	\neg	\neg								_		7				\neg	\neg		\rightarrow	\neg	$\overline{}$	_	$\overline{}$				-	-					7 777	-		
wi Chiaride	82603 82603	ug/L	- 2						т	\neg	- 1	- 1	-						TT.		1				\neg	- 1			: 1	. 1 .	. 1			. *		_	_		_	_		-			_
Notuelliuse 1-Dicklarpethens	82603	11971.	-				-		_	.			-								1 .		•	- 1	•						-	- 1		<u> </u>	-	H-i	+ :		-		_			\rightarrow	<u> </u>
-Dicklarpethens	H2GIIG	pg/L	7	140			-				- 1	- 1	-	-					<u> </u>		1 .		-			-		-	: 1		-				-	<u> </u>				_	-		_		
hympa chtoridi I S. Dichleroethene Dichleroethane	3260S	µg/L				T .	-		.	.	- 1	- 1						١.			 		7	- 1	-	- 1	- 1	-				- 1	-			1	+ :			_	_	-		· · ·	2.7
112-Dichlorgethene	82686	pg/L	170	18			1				-					-	-	-	1 .	•	1 .	1			-				. 1		. +	- 1		<u> </u>	 	1	+		_	_			\rightarrow		
Dichloroetqane	82608	uo/L	800	21		T :			.		17	-	-						1	·	 	· .		- 1	-	-		- 1	. 1		. [- 1			-	+	+:	_		_	_		-+-	1.9011	26
-Trichtorpathene	8260B	Jig/L	200	1940	45	3.7	- 41	9 1	5	20		13.5	6.5	6.9	6.5	12	67	13	7.9		1 -		•	- 1	•				-		_					T .	-	-	-					26	12
lichlaroethane	82605	143.1				1	-		- 1	7.9		-	-				-				1				•		-	-	- 1	- 1		-	-			 	.		-	-					
laraethere	82603	μg/L		16	2	2.5	3	4 1	.5	- 1	1,4	1,8	1,5	1,3	1,3	1.7	1.0	2.1	1 -	,		T :			*****	- 1		-	.										_	_		_	_		*****
rine		jig/L	IDOL		-	1	-			- 1		-	-		T-			-					•	- 1	•		-	-	-		. 1	-	-			1 .	1 .		_				_	-	
-Tricklarosthans	M2408	µ9/L		_ : .		1				- 1	-	-	-			-	٠.		1 -		1				-	-	-	-			. [1			_	_		-	-		
achinromhana	3260 B	μg/L	1	120	73	85	13	ia s	5	78	73	F1.1	58	70	59	BB	57	52	50		T:-		-	- 1	•						_	٠.	-	T .		١.			_		_			7.1	- 11
Xylanas (m.o. & pl	82608	I IIg/L	10,000			1 -					$\overline{}$		-	_	T -				1		T -	· ·		-			-	-	.		-		-			1 :			_				_	***	
																	•				**********	•												_			f								******
		Monito	ring Location								HIG	HERICA	3E										JEN	RÉN					SLAIS		$\overline{}$			Moss			Į.,		_	MDSIDA				cia	Ling
		S:	maling Date	: .1.95	A-02	1-0	3 94	03 .4	04 1 .	405 TJ	11-05	D-05	Jh-08	D-06	Mar 07	Jn-07	S-07	1 0.07	M-98	Je-05	A-U2	1-83	D-03	J-04 1	405 I Jr	-OS J	n-05 Ju	⊪-06 S	-07 T D	.07 D.	07	Jn.DG	0.00	1 Jrs-07	8-07	1 Mai	i Jnii	6 D-0	6 Ju	07 8	7 D-	57 M-	in in	Jn-135	M-0
'strafer	Method	Units	HICI			_					\neg		\neg	_					_		1	1								m-Di	8			1		+	تتنب			0. 0.		1,000	-		101-0
לורב	747IIA	un/L	1 2	,		1				- 1		-	- 1	•		-		1 .			1		-,-					-	-		•	-	•	1		+			-	-	-	٠.	-+-		
npla	6016B	big/L	0.0		0.01	1	-						-					1	—			-	7	- 1	•									+		٠.	+ -	┥.	_	_					
dfili	G016B	mg/L	1 2		0.05	4 0.0	:8 0	E20	- 8	1.01a q	1.015	0.619	0.010	3.017		0.012	0.017	0 016	0.016	9.917	-				-				-			-	•	1 -		+	<u> </u>	-	_	_	┅ ,			0.044	0.05
mluir.	GB1GB	mg/L	0,008		·	·	-	. 1					-		٠.		-	1		-		· · ·		•	-		-	-			, +			+		+	+ -	-	_	_	٠,			2-913	0.00
omium	60100	mgL	U,	٠.	0,01	7 .	-					-	- "				-		· ·				- 1	- 1	•									٠.		٠.	٠,	-	-				_	0.12	0.07
	60168	mg/L	3,015	, .	0.02	1 .	-		- 1		-	-	-		-	-		0.6055			٠.	٠.	٠.		7	-	-	-	-		- 1			٠.		٠.	1 7			-	-1-,	+,		2.12	0.00
mum	AD10B	mg/L	0.32	, ,		1		-		-	. 6	1,0260	-									†				-							٠.	٠.		+			_	_	-	- (-	_	
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Table 1 Central Wire Company Union, Illinois June 2006 Groundwater Samping Volatile Organic Compound Results

			g Lacation						na constant	may vind	MW-8	er on trains								ATTION OF THE	and the barry	ar Terre -	MW			4100-00 EE	ALCOHOLD BEAUTY		
		Sam	pling Date:	J-95	A-02	J-03	7-03	1-04	J-05	Jn-05	D-05	Jr-05	D-06	Jn-07	D-07	M-88	1.95	A-02	J-83	D-03	J-04	J-05	Jn-05	D-05	Jn-08	D-06	2n-07	D-07	M-05
Parameter	Method	Units	MCL			-		-	-	-								_			-	and the latter designation of	-						
Vinyl Chloride	5260B	µp/L	. 2									1 15		5									-						-
Chloroethane	9260B	1/0/1	7.000	7.4	74			-		1 10	- 24	1 1	2 2				1 .		-		-				1	10			-
1,1-Dichlorosthens	8260B	Tio.F	7	[2]	24	17		1.4	7	- 17	12	100	11.	- 52	12.		1 .		-	-	7.	7 .	100	7	120	71.20		_	
Mothylene chioride	8260B	uo'L	100	- 6		-	-			- 10	-		8 98 .	2	- 4				-			-				-	-		-
ptal 1,2-Dichloroothone	82408	110/L	170	204	1.9	- 1		12	4.1	2.1	7.39	4.6	6.5	44	3.1	1			-		-	1			-	1 20	12.1	-	-
1,1-Dichloroethane	8250B	HO.T	806**	5.J	3.9		- E+	20	7.6	5.6	14.3	7.9	9.3	6.6	29	\$8.1			127	-	-	127	- 12	0	100		-		-
1,1,1-Tricklergethane	9260B	J'au	200	22	29	13.		34	24	13	23.1	31	42	64	21	12	12	3.6		-	-	-	-	- 1		-	-		-
1.2 Dichloraethane	9260B	HD/L	5			7.0	- 1	-	-	100	1000	100		U 12 11	- 2	- 0		-	-		-	-	-	_	-	10.0		100	-
Trichlorgethene	9260B	ne.r	5	34	21		7.0	16	23	10	11.6	27	20	14	18	11		1.5		-	-		-		-10	-	-	-	-
Columns	9250B	iio?i	1000	-	27	525	1.0	-	-			7.		-	- 10	- 1	1		-	- 0	-1	0.00		-	77.0	- 3	-	120	-
1.1.2-Trichlorgethane	8260B	(100)	5	2-	72												1 .	-		-	-	-		-	-		1	-	-
Totrachiorosihene	8250B	J'ou	5	110	190			150	200	180	135	150	100	140	12	120		12	_					-	-	1.5	-	7.1	-
total Xylenes (m.o. & p)	82508)ig/L	10,000		10	13.	63	-	17.	13	122	-	12	9	100		9	- 10	-	(2)	1	1	-	- 1	7.	Lot		1.1	-
	_	Market .	a Location								MW-8	250		9 0			_												***
	-		pina Date:	1-95	A-02	J-03	D-03	J-04	1-05	Jr-05	D-05	Jn-05	D-06	Jn-07	D-07	M-08	1.95	A-82	J-03	D-43	J-04	1.05	MW.						
Paraineter	Melhad	Units	MCI.	3-57	ANIE	343	D-0.3	3404	3-05	JI-US	D-05	36-06	D-46	Jh-uz	D:07	M-US	2.95	A-62	2-03	D-63	3-04	345	Jn-05	D-05	Jn-DG	D-06	Jn-07	0-07	M-08
Mercury	7470A	HQ*L	2			-		-	-		0.00023	-			-	-			_	-		_	-	-					-
	8010B	ma'L	0.01	_	_	-			-	-	U.Eucza	10	14	-			-	-	-			-1-	-	25 1/2	150	-		-	
					0.062	-		-	0.047	0.071	0.038	0.037	0.051	0.072	0.024	0.024	-	0.029	0.036	D 039	-	0.024	.0.036	0.034	0.041	0.053	0.052	0.039	-
Arsenic			- 2									0.031		0.072	0.024	0,024		u.u.za	0,039	0,433	-	12,024	.0.930					0.039	0.03
Barium	60108	rng/L	0.005	0.044	0,062		-																						
Barium Codmium	6010B	mg/L mg/L	0.005	0,044	0,062		-	-:-		C. A.		0.022	2012			0.000	-		$\overline{}$		-			-	-	-		-	- 7
Bailum Codinium Chronium	6010B 6010B	mg/L mg/L mg/L	0.1	-	-		:	÷	-			0.023	0.013	0.0037	0.029	0.029		0.000	2.002	(4)	1			7.8	0.850	- 33	14	5-5	
Barium Codmium	6010B	mg/L mg/L		0.044	-		Ė		-		0.013 J	0.023				0.029 0.0062		0.072	0.023	3.4	÷			0.023 J	0.850		14	-	0.007

Key: J = Parameter detected below quantitation detection - Not Detected

* Not Analyzed

** Region 9 Preliminary Remediation Good

INDE Interior mentages and Visitor Technique

IMW Interior monitoring was (inside Techniloy fence)

VOCMASTERTable 1 VOCD - 3-2008 Semi Annual RCRA Sampling.xls

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Table 1 Central Wire Company Union, Illinois June 2006 Groundwater Samping Volatile Organic Compound Results

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			noling Cale:	F-95	A-02	Ja -05	Jn -35	Jn-C6	D-36	Jn-07	S-07	D:07	E0-14	F-99	A-02	Jn-05	-0.85	Jn-86	p-as	Jp-07	5-07	D-37	Hr-06	F-56	A-62	Jp-65	D-05	in-06	D-66	Jr07	5.00	D-06	H-va	Mar-07	5-37	D-07	N1-09
aramoler	Method	Utilis	MCL				1																									-	******				
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Marnethane	9260B	μg/L									-			-	120	-		-								26	178	2.8				-	- i	-			
1-Dichlarosthene	9260B	≱g/L	7				-	-		- 1	- 1	- 1	-	- 6	21	26	13.5	6.9	4.6	26	46	93	33	4	24	86	98.4	93	68	87	20	67	66	_		-	-
lethylene chlonde	92EXIB	الوس .			-						- 1		-									-	-			-				· · · · · · · · · · · · · · · · · · ·			- 70				
Mail 1,2-Dichloros/hene	9260B	,eq/l.	170									. 1		-	-	3.5	9.43	1.4		3.4	6.3	11.6	3.2		—	18.5	51.1	49.1		9.3	39.7	30.8	27.3				· :
1-Dichlersethane	9260B	a9°L	80011							-	- 1	- 1	-	1	45	17	18.4	16	19		3.8	77	22	2	100	10.1	269	270	530	450	250	210	230				H :
.1,1-Tdchiopaethann	9260B	wa'L	200	-	7,2	22	139	1.2	1.3	1.1	1.4	1.5	2.5		03	140	47.2	22	15	26	150	340	250		1	4.1	12.6	715	12	5.4	5.1	23	3.3	4.2	3.4	5.4	51
.2-Dichloroshare	9260B	jug/L	5		-	-	-		-	-		-		0.6	150	-	18-4			-		0.10		2	37.5		2.54	2.8	2.6	4.7	- 2.1	4,3			4/1	9.4	
ricHarvelhene	9263B	pg/L	5	0.6		-1			1.0		-	7.1	1.0	4	5.1	31	21.6	12	9.7	13	8.9	46	30	-		2.5	7,46	5.5	6.2	-	4.4	4.4	2.0	÷		1.6	·
nlugna	9263B	ug'L	2000			-			-			-			***		1.25	-			-		-				7.54				7-7		2.0	_	\rightarrow	1,0	
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arameter	Method	Units	MGL								$\overline{}$	$\overline{}$															V	7777		Bill 02	0.07	0.01		reletteral.	~~~~	D-07	IXP BID
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vsenia	60106	Ang!L.	0.61		1	0.024	0 0:1 J	-	-	-	-	-				0.021	0.021	·			d DS4	0.074		•	. ;			†			0.021	D.0012				0.612	0.006
Larluery.	60108	zeg/L	2			-	D 026	0.023	0.628	G.G25	0.024	0.03	0.029				0.0233	B 522	0.023	0.024	-	7172	0.023			11.1	15 OR7	11.079	6.071	0.035	0.097	0.1	p.11	-		0.012	0.006
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VOCMASTERTable 1 VOCD - 3-2008 Semi Annua! RCRA Sampling.xls

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Table 1 Central Wire Company Union, Illinois June 2006 Groundwater Samping Volatile Organic Compound Results

		Monte:	ing Luceture		SEM	N.2**-			SEVI	V-3***		FLAGPOLE	& GANVIK	15013	19017	B. Br. Nurser	16776	16314	15408	Kui Pur
		Sai	molino Dale:	Mis/-87	S-07	D-07	M-06	Mar-97	8-07	D-07	1d-0.9	14-09	E9-61	M-Ba	13.00	M-Ga	M-3B	H3-DB	14-03	M-G3
arameter	Method	Units	MCL										1						10.00	
/inyl Chloride	82603	ISR/L	2		T .	-					-	1 .	1 .			1 . :	. "			_
Chromonthapper	82508	gus'L	157			···	-						1			1				1
1.1-Dishlotgethene	0280B	µa/L	7		48		T			-		· · · · · · · · · · · · · · · · · · ·	1 -							+ :
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ote: 1.2-D-chlarpell.sive	8280B	µm/L	170	-								·	····				-			
,1-Dishlomethane	8260B	-c/ -	8:10**									1 .				. 1				.
,1.Trichlerosthane	BSROB	M97L	203	5.1	1.2	7.7	6.2	76	1.2	1.6	2.1							_		
1.2-Dinhlomethane	8260B	μp/L	- 5	-				-	-:		-				-	1 .				+
frichlaroethene	8200B	Jep'L	- 5			1.7		·			·		1 -		- ""		-			
Гозинали	82608	µp/L	1003			· ·			-											1
1,1.2-Troble ostrate	8280B	µg'L						-		· · · · · · · · · · · · · · · · · · ·		†	····	-			-			· ·
Tetrachloroelhene	#260B	µG/L		37	16	44	48	15	16	18	18									
alài Xylenes (m,a, & p)	RSOUB	μeVL	10,000			·					-	-		ŀ	-	· ·				1
	1	Maritia	dno Locator		CELE	N-2*			0.7%	W.3**			·	_						
	1		molino Dete:	Mar-07	S-07	D.67	61-03	Mar-07	\$-07	70-3	H-D8	14-08	N-08	74:05	M-Q8	M-09	Mana	1A-06	M-63	M-05
*arameter	Mathud	Unils		mor er	0.01	5791	181100	mang - Dr	9-31	124-11	•	7 Prou	iki-ou	IN-BG	na-ub	m-us	M-UD	1200	195-6-3	Miles
Mercury	747QA	μα'L	2	-		٠.			7				! •	-	-					٠.
visenic	feu : oB	mod	0.01	-		- 1						-		-					٠,	٠,
Sanum	EGICE	mat	2	,	0.016	0.02	9.057	-	0.016	6.015	6.014									-
Sedmlara	16010B	mork	0.005	-						4.00		-		-	-					٠.
Shramium	isa san	nigh.	0.1				0.073			-	<u> </u>	٠.		,					-	٠.
	6010B	molL	0.015			-		-	-		1 .		———		-		-			
.ead Selenium	10010B	mg/L	0.05																	



Table 2 Techalloy Union, Illinois March 2007 Geoprobe Samping Results

		Monitoring	Location	GP-2S	GP-2D	GP-35	GP-3I	GP-3D	GP-4S	GP-4I	GP-4D	GP-5S	GP-5	GP-5D	GP-6S	GP-6I	GP-6D	GP-7S	GP-71	GP-7D
		Samp	ling Date:	Mar-07	Feb-07	Feo-07	Feb-07	Feb-07	Feb-07	Feb-07	Feb-07	Mar-07	Mar-07	Mar-07						
Parameter	Method	Units	MCL																	
Vinyl Chloride	8260B	μq/L	2			-	-	-		_	-	_	_		-	_	-	_		_
Chloroethane	8260B	μg/L		-	-	-	-			-	-	-		-	-		-	-		
1,1-Dichloroethene	8260B	μg/L	7	-	T -	12	17	8.9	-	-	-	-	-		-		_			-
Methylene chloride	8260B	μg/L		-	-	-	· ·	-	-	-	-		-	-	- "			-		-
total 1,2-Dichloroethene	8260B	μg/L	170	-	-	-	5.7	3.4	-	-	-	-	-	-	-	-	-		-	-
1,1-Dichloroethane	8260B	μg/L	800**	-	-	1.0	19	13	-	-	-	-	-	-	-	-		_	-	-
1,1,1-Trichloroethane	8260B	µg/L	200	6.2	-	100	73	10	-	-	-	15		-	-	-	-	-	-	
1,2-Dichloroethane	8260B	μg/L	5	-	-	-		-	-	-	-		-	-	-	-	-	-	-	-
Trichloroethene	8260B	μg/L	5	3.1	-	59	42	11	-	-	-	4.7	-	-		-			-	-
Toluene	8260B	μg/L	1000	-	-	-	-		-	-	-	-	1.4	-	-	-	-	-	-	-
1,1,2-Trichloroethane	8260B	μg/L	5	-	-	-	-	-	-	-	-	,		-	-	,		-	-	-
Tetrachloroethene	8260B	μg/L	5	-	- "	-	-	-	-	-			-	-	-	-	-			-
total Xylenes (m,o, & p)	8260B	μg/L	10,000	-	-			-		-	-	-	-	-	-	-	- ""		-	-

- J = Parameter detected below quantitation detection limit
 Not Detected
 Not Analyzed
 Region 9 Preliminary Remediation Goal

VOCMASTERGP Samples - 2007

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TABLE 3 ESTIMATED (RELATIVE) VOC TRANSPORT RATES

Central Wire Company; Union, Illinois

	Relative	_ + ****	nated 1 Velocity
K _{oc}	Velocity	ft/day	ft/year
	1.00	2.2	802
32	0.74	1.6	592
59	0.60	1.3	482
110	0.45	1.0	358
155	0.36	0.80	292
166	0.35	0.77	280
	 32 59 110 155	K _{oc} Velocity 1.00 32 0.74 59 0.60 110 0.45 155 0.36	K _{oc} Relative Velocity Transport ft/day 1.00 2.2 32 0.74 1.6 59 0.60 1.3 110 0.45 1.0 155 0.36 0.80

Organic carbon fraction $f_{oc} = 0.002$ Bulk density (g/cm3) $d_b = 1.8$ Effective porosity n = 0.32

Koc and other soil parameters values: IAC 742 Appen. C Table E.

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Table 4
Additional Residential and Commercial Wells

	Owner of Residential Well	Depth of Well	Screened Interval	Address
	Non-responsive	Deep well- 70 Feet	40 to 70 Feet	Non-responsive
		Deep well - 85	50 to 80 Feet	•
1		Shallow well - 25	Point	
$ \sqrt{} $		Shallow well	Point	
9		Shallow well	Point	
V		Shallow Well		
6		Intermediate well 50 feet	Point	
0		Shallow well – 30 feet	Point	
1		Deep well – 250 feet Flag Pole -30	Cracked Lime & Shallow	
8		Well in "05"- 67' Bottled water due to N?		
A		Intermediate Well 30' Bottled water due to N?	Point	
0		Bottled water due to N?	Point	
()		Deep-67' 5" well used for irrigation. Bottled Water		
12		Shallow Well 30' Non-responsive Tap Water	Point	

Shallow well -10 feet to 30 feet Intermediate well – 30 feet to 60 feet Deep well – 60 feet to 90 feet

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Minutes of Techalloy Meeting with U.S. EPA March 11, 2008

In attendance were:

U.S. EPA

Central Wire

Dr. Bhooma Sundar, RCRA Project Manager Mr. Gary Cygan, Geologist Mt Gerry Ruopp, General Manager Mr. Scott Carr, Environmental Coordinator Mr. Bob Brod, P.G. Hydrogeologist (Matrix) Mr. Steve Grant, E.I.T., Project Engineer (Matrix) Mr. Jack Thorsen, P.E. Project Manager (Matrix)

After introductions were made, Central Wire (Techalloy) provided a summary of solvent usage at the facility in the 1960s through the early 1980s including the remedial actions that were put in place to mitigate the impacts of this solvent use.

U.S.EPA (EPA) indicated that due to time constraints, they would like to discuss actions that might be taken to control the movement of the plume. Mr. Cygan thought that there was insufficient data to calibrate and validate a groundwater model that has the additional stresses of the extraction wells and the pull on the plume from the Central Sod irrigation wells. He did indicate that the model would be useful in verifying conditions found in the field and that additional field data could be used to further calibrate the model.

Dr. Sundar began speaking about short term goals (six months) and longer term goals, with the primary objective being to develop actions to protect downgradient residences and address the plume in a manner that controls the plume into the future.

There was considerable discussion about Monitored Natural Attenuation (MNA) as a possible solution to mitigate the solvent plume at this site. Some of the items discussed included:

1. Mr. Cygan indicated that the MNA is a formal program that Techalloy can propose but there are certain factors that must be evaluated by EPA in order for them to agree to MNA as a viable remediation alterative. He also indicated the plume must not be an expanding plume in order to qualify for

- inclusion in this program. He indicated that the first step in doing this was to develop a viable Conceptual Site Model <u>THAT INCLUDES THE SOD</u> FARM WELLS.
- 2. He also indicated the MNA was typically used with other active remediation measures and noted that Techalloy did have three of these in place (the Soil Vapor Extraction System and the Air Sparging System to control the source of the plume and the pump and treat (air stripping treatment) to control the contaminant plume).
- 3. He indicated that information collected to allow for a MNA solution included that it must be able to be accomplished in a reasonable time frame with reasonable being defined as 10 15 years. ONLY A SUGGESTED TIMEFRAME
- 4. He also stated that, as a result of other "environmental stresses" (Central Sod irrigation well pumping at up to 1,250 gallon per minute for up to 12 hours a day for up to six months per year), that an augmentation to the remedy as it stands may be needed. He mentioned the potential neutralization of the impact of the Central Sod irrigation well by the introduction of an additional extraction well. THIS WAS IN THE CONTEXT OF THEIR DISCUSSING WAYS OF CONTROLLING THE PLUME. Techalloy's first response to this suggestion was that it did not seem to be feasible from a cost perspective to do this. THIS WAS STRICTLY A WHAT IF COMMENT TAKEN OFF OF ONE OF THEIR COMMENTS
- Mr. Cygan then discussed some of the monitoring requirements that must be put in place in order to collect the information needed to participate in a MNA program at the site. He discussed the need for sentinel wells, perimeter wells and performance wells. The sentinel wells would make sure that the plume had not progressed beyond them. The perimeter wells were in place to monitor the location of the plume, i.e., not unlike sentinel wells, but side gradient or upgradient of the main body of the plume. Performance wells were in the plume and monitored the degradation of the chlorinated plume from PCE to TCE to DC to VC. Mr. Cygan made some suggestions on where these wells could be located. Mr. Carr indicated that, based on his knowledge in dealing with property access in the past, he knew where Techalloy could and could not get access.
- 6. Mr. Cygan also provided Techalloy with two documents. The first is entitled "Region 5 Framework for Monitored Natural Attenuation Decisions for Groundwater" and the second is a list of <u>ADDITIONAL</u> MNA guidance documents.

The discussion then turned to other actions that could be taken to limit residential exposure to the plume and there was a brief discussion the groundwater use restrictions that are in place and the expansion of that restricted area at least to Illinois Highway Route 176. EPA indicated that they had no problem with the groundwater restriction

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proposed by Techalloy, but that EPA would not longer be involved with this issue in terms of McHenry County's approval and implementation.

The meeting then broke to drive around the site and review the situation. The group observed the property, the Highbridge well, extraction well no.2, the area where residential samples are currently collected, the area where the Geoprobes were placed and water samples collected in 2007, the two Central Sod wells (Non-responsive) the pump and treat facility and extraction well no. 2.

The meeting reconvened to discuss upcoming actions and the time frame for these actions. The group focused on the short term actions (March through September) which would include planning for the longer term or final actions. The short term time frame was determined to be the next six months or through September 2008 and we agreed to meet in early September 2008 to review progress at that time.

EPA was most concerned about protecting the residents. To do this, U.S.EPA felt that new sentinel wells should be placed now. BY THE END OF THE FIELD SEASON

THIS YEAR Techalloy believes that it is premature to determine the placement of those sentinel wells now and that it would be of greater value to physically determine the end of the plume within the next three months so we can then determine how far the plume has migrated since the February 2007 Geoprobe sampling event that last found the end of the plume then. Techalloy can then determine how far the plume moves in one year. That information will be provided to EPA as soon as it is available.

EPA feels that Techalloy should develop a Conceptual Site Model of the plume as it now is configured, i.e., its migration up to 1,500 feet past the sentinel wells. In order to do this EPA believes Techalloy needs to meet with Central Sod personnel to determine Central Sod's frequency of pumping of groundwater, quantity pumped, schedule for running wells and what their overall irrigation strategy is. SOMETHING THAT
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on the width of the plume. If Techalloy believes that MNA is part of a remedial approach, the information needed to make that decision should be collected in the next six months.

EPA also expressed a desire to have Techalloy sample the three homes on the north side of Illinois Rt. 176 across from South Branch Nursery as well as the just in front of the South branch property on the south side of Rt. 176.

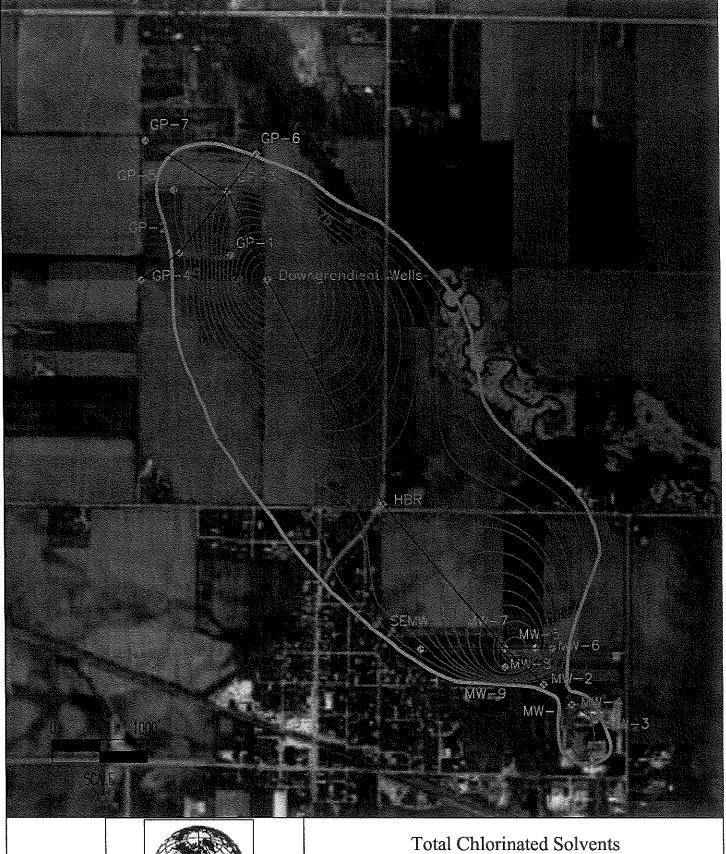
All parties also agreed to change the RCRA semi annual groundwater monitoring from June and December to March and September of each year.

Lastly, with the information collected, EPA wants Techalloy to develop a plan that will resemble a Corrective Measures Study of the plume and its migration which will identify and evaluate alternative remedies THIS IS WHAT A NUMBER OF MY OTHER
DISCUSSIONS POINTS WERE ABOUT! to control the plume so that it does not impact water wells before it dissipates and degrades.

The meeting adjourned with Techalloy volunteering to draft the minutes of the meeting and route to all participants for comments and to put together a schedule for the March Through September time frames.

BHOOMA, very little of their words appeared in the minutes, they make it seem as though we did all the talking. Now knowing how Scott can talk, do the minutes seem accurate?

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Matrix Environmental Inc. 1880 W Winchester Rd Suite 111 Libertyville, IL. 60048



Techalloy Company, Inc. 6509 Olsen Rd. Union, IL. 60180

SIZE | FSCM NO. 04/13/2007

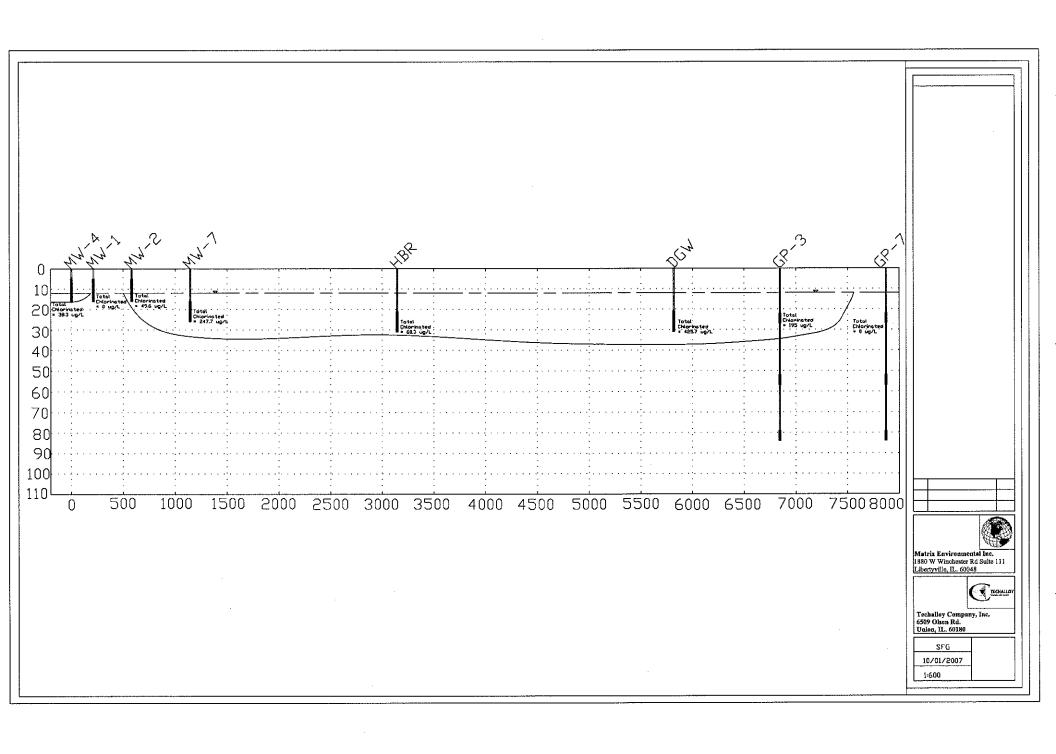
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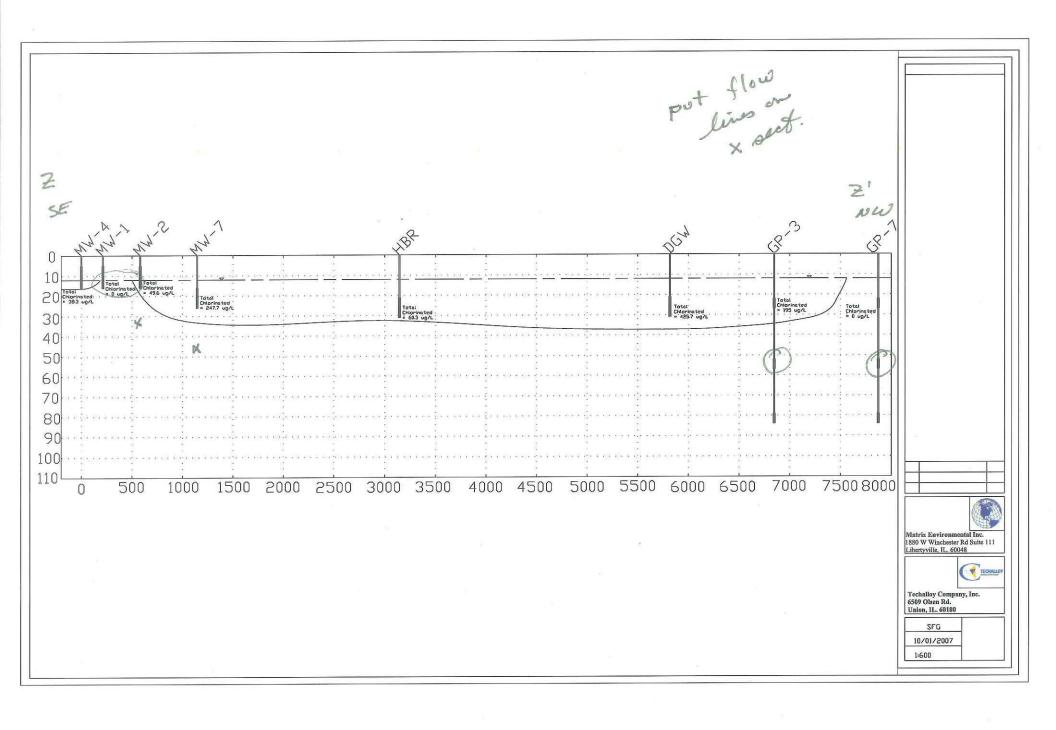
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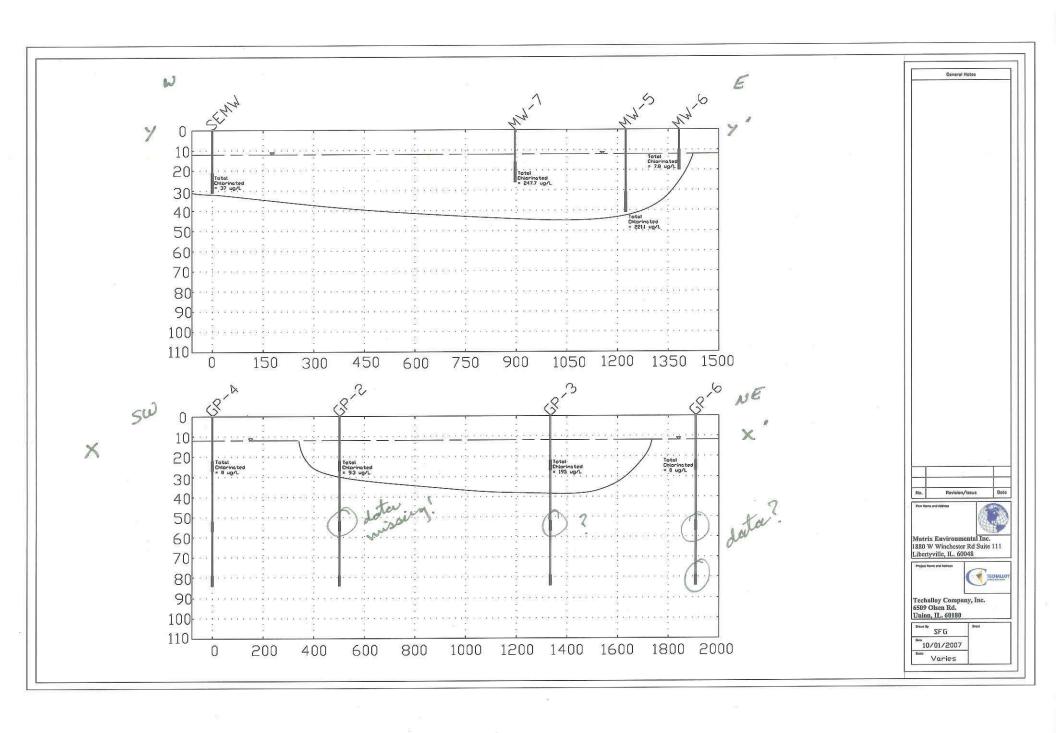
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SHEET









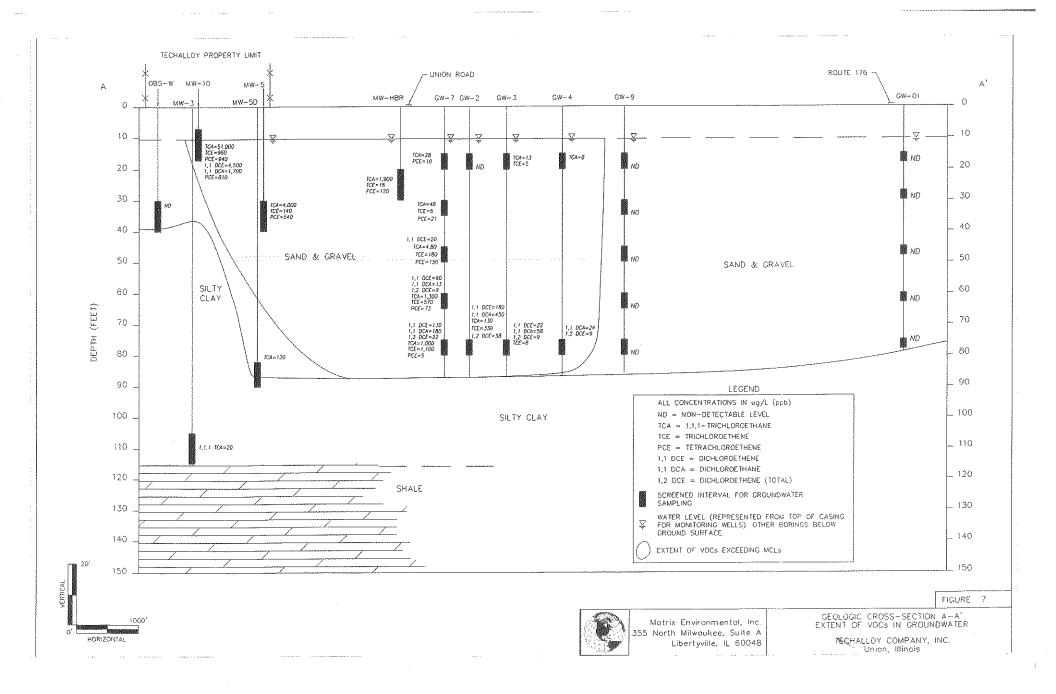
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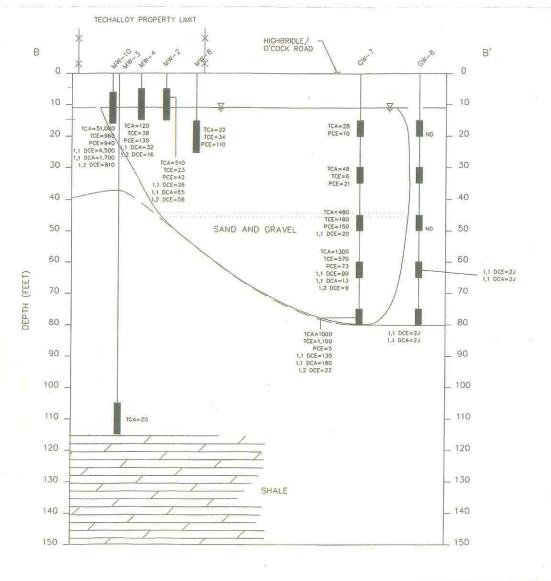
Residential Well Information and High Capacity Irrigation Well Locations Union, Illinois

Owner of Residential Well	Depth of Well	Screened Interval	Address
Central Sod Well #1	Deep well- 70 Feet	40 to 70 Feet	Non-responsive
Non-responsive	Deep well - 85		
	Shallow well - 25		
	Shallow well		
	Shallow well		
	Shallow Well		
	Intermediate well 50 feet		
	Shallow well – 30 feet		
	Deep well – 90 feet		

Shallow well -10 feet to 30 feet Intermediate well - 30 feet to 60 feet Deep well - 60 feet to 90 feet

3/1/07	GP-7S	27'	12:37 – 12:41	14:17	8.1	48.9°F	14:21
				14:19	8.0	49.5°F	-
				14:21	8,0	49.5°F	
3/1/07	GP-71	57'	12:11 – 12:19	13:55	7,5	50.8°F	14:00
Translation and translation an			The state of the s	13:57	7.4	51.4°F	
****		The second of th	W L	14:00	7.4	51.4°F	
3/1/07	GP-7D	84*	11:05 - 11:18	11:40	7,8	50.5°F	11:45
				11:42	7.9	50.6°F	
				11:45	7.9	50.6°F	





LEGEND

ALL CONCENTRATIONS IN ug/L (ppb)

ND = NON-DETECTABLE LEVEL

TCA = 1,1,1-TRICHLOROETHANE

TCE = TRICHLOROETHENE

PCE = TETRACHLOROETHENE

1,1 DCE = DICHLOROETHENE

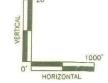
1,1 DCA = DICHLOROETHANE

1,2 DCE = DICHLOROETHENE (TOTAL)

SCREENED INTERVAL FOR GROUNDWATER

WATER LEVEL (REPRESENTED FROM TOP OF CASING FOR MONITORING WELLS). OTHER BORINGS BELOW GROUND SURFACE.

EXTENT OF VOCs EXCEEDING MCLs.





Matrix Environmental, Inc. 355 North Milwaukee, Suite A Libertyville, IL 60048 GEOLOGIC CROSS-SECTION B-B' EXTENT OF VOCs IN GROUNDWATER

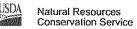
FIGURE 8

TECHALLOY COMPANY, INC. Union, Illinois

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Soil Map-McHenry County, Illinois (Techalloy Soil Info)





Web Soil Survey 2.0 National Cooperative Soil Survey

Very Stony Spot

Short Steep Slope

Wet Spot

Other

Gully

Other

Cities

Oceans

Rails

Urban Areas

Streams and Canals

Interstate Highways

US Routes

State Highways

Local Roads

Other Roads

MAP LEGEND

Area of Interest (AOI) Area of interest (AOI) Solls Soil Map Units Special Line Features Special Point Features ħ. Blowout \odot 1019920 Borrow Pit A . Ж Clay Spot Political Features Closed Depression Municipalities Gravel Pit **Gravelly Spot** Landfill **Water Features** Lava Flow Marsh Transportation Mine or Quarry Miscellaneous Water Roads Perennial Water Rock Outcrop Saline Spot Sandy Spot Severely Eroded Spot Sinkhole Slide or Slip Sodic Spot Spoil Area Stony Spot

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

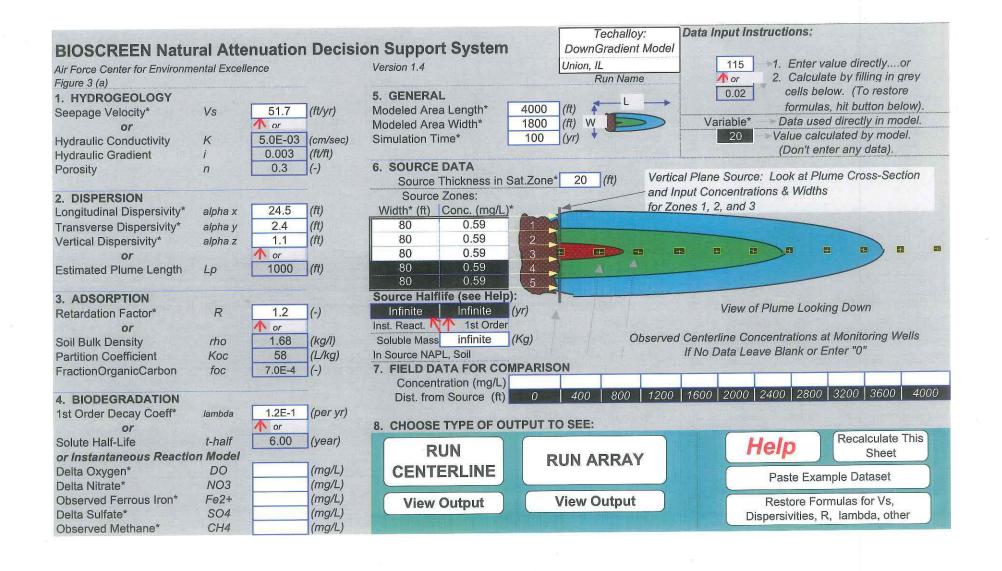
Source of Map: Natural Resources Conservation Service Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov Coordinate System: UTM Zone 16N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: McHenry County, Illinois Survey Area Data: Version 6, Dec 29, 2006

Date(s) aerial images were photographed: 1988; 1998

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



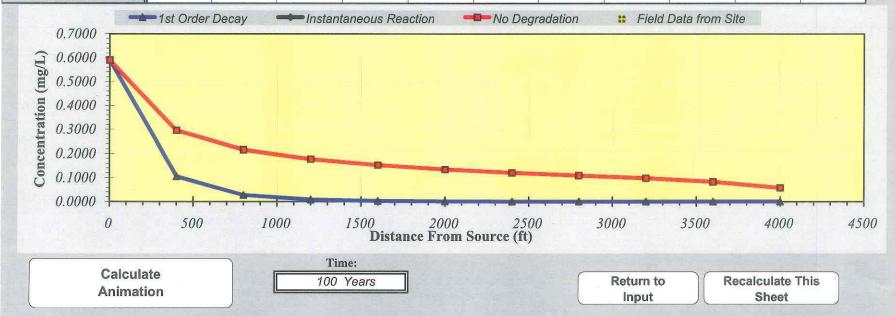


DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

Figure 3 (b)

Distance from Source (ft)

TYPE OF MODEL	0	400	800	1200	1600	2000	2400	2800	3200	3600	4000
No Degradation	0.590	0.295	0.216	0.177	0.152	0.134	0.120	0.108	0.098	0.083	0.058
1st Order Decay	0.590	0.105	0.027	0.008	0.002	0.001	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	0.590	0.295	0.216	0.177	0.152	0.134	0.120	0.108	0.098	0.083	0.058
Field Data from Site							LV.				





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Scott Carr

From: Rosegay, Margaret N. [margaret.rosegay@pillsburylaw.com]

Sent: Tuesday, November 06, 2007 4:28 PM

To: peaceman.karen@epa.gov

Cc: scarr@centralwire.com; HLopes@centralwire.com

Subject: FW: Techalloy Union Financial Assurances

Karen, here is the answer to your question regarding the source of the adjustment factor. May we please obtain written confirmation of EPA's approval of the new financial assurance estimate?

Thanks very much.

Meg Rosegay

Pillsbury Winthrop Shaw Pittman LLP 50 Fremont Street San Francisco, CA 94105 margaret.rosegay@pillsburylaw.com

Tel: (415) 983-1305 Fax: (415) 983-1200

From: Scott Carr [mailto:scarr@centralwire.com]
Sent: Tuesday, November 06, 2007 2:07 PM

To: Rosegay, Margaret N.; HLopes@centralwire.com

Subject: RE: Union Financial Assurances

Meg-

I have attached the title, link and original letter 10-08-07 letter doc that was sent to Karen, Gross National Product Implicit Price Deflator Index (see http://www.economagic.com/em-cgi/data.exe/fedstl/gnpdef+1). If you have any other question feel free to contact me.

Thanks,

The contents of this message, together with any attachments, are intended only for the use of the individual centity to which they are addressed and may contain information that is legally privileged, confidential and exempt from disclosure. If you are not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this message, or any attachment, is strictly prohibited. If you have received this message in error, please notify the original sender or the Pillsbury Winthrop Shaw Pittman Help Desk at Tel 800-477-0770 x4860 immediately by telephone or by return E-mail and delete this message, along with any attachments, from your computer. Thank you.

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UNION, IL HOUSTON, TX PERRIS, CA 815-923-2131 FAX 815923-2126 713-466-1000 FAX 713-466-7425 951-657-2105 FAX 951-943-6061

THE LEADING MANUFACTURER OF STAINLESS STEEL, NICKEL AND COPPER ALLOY WIRE PRODUCTS EXECUTIVE OFFICES: PERTH, ON CANADA-EMAIL sales@centralwire.com

As. Karen Peaceman, ESQ. J.S.EPA Region V, DE-9J 77 W. Jackson Blvd. Chicago, IL 60604-3590

October 8, 2007

RE: Cer

Central Wire Union Plant RCRA Financial Assurance

Dear Ms. Peaceman

Central Wire Union Plant is updating its 2007 instrument of financial assurance under RCRA and addressing the letter dated March 20, 2007 address to David Novitski from Jacqueline Miller. Attached is a worksheet that shows how Central Wire calculated this value. The costs are escalating \$17,000 to \$18,000 per year.

Since Central Wire has not yet updated the financial assurance instrument to 2007, we would like to propose that we update now to an estimated 2008 value based on an average the last 14 quarters of escalation as shown in the Gross National Product Implicit Price Deflator Index (see http://www.economagic.com/em-cgi/data.exe/fedstl/gnpdef+1) beginning in the first quarter of 2004. This information is also shown in the attached spreadsheet. This would save Central Wire the time and fees associated with the purchase of the 2007 financial instrument just two months before purchasing the 2008 financial instrument. That is to say, Central Wire proposes to purchase the RCRA financial instrument that will cover the cost escalation to 2008 in 2007.

Please call me (215.923.2116x130) or Jack Thorsen at Matrix Environmental, Inc. at 847.367.6835 when you are available so we can discuss this matter.

Very truly yours, CENTRAL WIRE

Scott C. Carr Environmental Coordinator

cc:

Ms. Bhooma Sundar USEPA

Mr. John Thorsen

Matrix Environmental, Inc.

Mr. Henry Lopes

Central Wire

Mr. Gerry Ruopp

Central Wire

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APPENDIX A

(Generic) Field Sampling Plan (Remove *generic* when made site-specific)

Name of Regulated Facility
Address
City, State, ZIP
RCRIS ID

SAMPLING AND ANALYSIS PLAN

DATE

This Land and Chemicals Division Generic Field Sampling Plan provides guidance for the preparation of project-specific field sampling plans (FSPs) for the collection of environmental data. Default generic sampling and analytical protocols are included which may be used verbatim or modified based upon project-specific data quality objectives (DQOs – See Generic QAPP). The goal of this document is to promote consistency in the generation and execution of sampling and analysis plans and thus to help generate chemical data of known quality for its intended purpose.

This manual applies to all LCD sampling events conducted by EPA Region 5 Land and Chemicals Division Staff having responsibility for sampling and analysis of environmental samples within their branch. This includes, but is not limited to RCRA Branch inspectors, Remediation and Reuse Branch (RRB) project managers, Chemicals Management Branch inspectors, and others having activities pursuant to and in support of execution of the following programs: the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Areas in RED FONT are generic items requiring change, when made specific to a particular site or facility sampling event.

Prepared by:

U.S. Environmental Protection Agency Land and Chemicals Division 77 W. Jackson Boulevard Chicago, Illinois 60604

Release 1.0 – May 2008

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LIST OF ACRONYMS

CFR Code of Federal Regulations

CRL Central Regional Laboratory (Change laboratory if necessary)

LCD Land and Chemicals Division

PPE Personal Protective Equipment

QA Quality Assurance

QAPP Quality Assurance Project Plan

QC Quality Control

QMP Quality Management Plan

RCRA Resource Conservation and Recovery Act

RSD Relative Standard Deviation

SAP Sampling and Analysis Plan

SOP Standard Operating Procedure

TCLP Toxicity Characteristic Leaching Procedure

U.S. EPA Environmental Protection Agency

1. INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by the United States Environmental Protection Agency (U.S EPA) as a project planning document for the SAMPLING AND ANALYSIS of Contaminants (FILL IN) at A SPECIFIC FACILITY, located at LOCATION.

This SAP summarizes the field and laboratory tasks necessary to sample and analyze (FILL IN). The objective of this effort is to determine if (A HYPOTHESIS IS TRUE OR UNTRUE, for example: the samples meet the definition of a hazardous waste, and should therefore be managed according to the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) and its implementing regulations). Upon completion, the data will be used by the U.S. EPA to assess Jim Nayzium's compliance with the regulations pertaining to Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities

The U.S. EPA Region 5 LCD Quality Assurance Project Plan (QAPP) for this site presents detailed information about U.S. EPA's quality assurance (QA) and quality control (QC) protocols for sampling and analysis activities in Region 5. This site-specific SAP will supplement the plan with information that is specific to this project. Both this site-specific SAP and the QAPP are subordinate to, and consistent with, the U.S. EPA Region 5 LCD Quality Management Plan (QMP) of May 2008.

The QMP establishes U.S. EPA Region 5 LCD's quality system for sampling work assignments. The QMP also defines requirements for control of accountable documents and records, provides the strategy for assessing the effectiveness and implementation of the overall quality system, describes the roles of and interrelationships between the various QA/QC plans, and describes how the quality of work will be controlled.

This SAP is a sub-tier document to the QAPP, which outlines the general requirements and protocols for waste sampling and analysis activities performed by U.S. EPA Region 5 LCD. The QAPP was designed to comply with and support the Region's quality management policies as prescribed in EPA Requirements for Quality Assurance Project Plans (QA/R-5), EPA Guidance for Quality Assurance Project Plans (QA/G-5), EPA Quality Manual for Environmental Programs (EPA 5360), and Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs (ANSI/ASQC E4-1994). In addition, the QAPP provides guidance and requirements for developing and implementing site SAPs that are also compliant with these reference documents.

The remainder of this document describes the tasks associated with sample collection, handling, shipment, and analysis.

1.1 PROJECT HISTORY AND SUMMARY

DESCRIBE HERE: HERE IS A GOOD EXAMPLE

Jim Nayzium Recycling (Jim Nayzium) receives various types of waste lamps including fluorescent, porcelain, H.I.D., U-shaped, shattershield, and miscellaneous lamps for processing in its mobile treatment unit. The mobile treatment unit crushes the lamps in a closed system, and mercury is captured in the form of mercury sulfate by a series of carbon filters. Reportedly, neither the crushed bulb material nor mercury sulfate possesses the characteristic of toxicity for mercury. Both are land disposed off-site. The majority of the lamps processed by Jim Nayzium appear to be 4 ft. fluorescent.

Jim Nayzium also handles ballasts, batteries, cathode-ray tubes, computers, and other electronic wastes at its facility.

On October 26, 2007, the Village of Badland served the U.S. EPA with notice that it intends to sue Jim Nayzium under Section 7002 of RCRA. From the notice, it appears that the Village intends to sue Jim Nayzium for operating a universal waste recycling facility without a RCRA Permit. The Village also discovered and photographed numerous broken bulbs inside and outside of the facility, and appears to intend to raise this as an issue in its suit. The Badland Tribune published an article on this subject on October 29, 2007.

Representatives from U.S. EPA's RCRA Branch and Superfund Division went to the Jim Nayzium facility on November 29, 2007, to assess the situation. No one from Jim Nayzium was present at the time to allow for the inspection. Members of the RCRA Branch and Superfund Division returned the following day, after prior coordination between U.S. EPA and representatives of Jim Nayzium, and were granted access to perform a RCRA inspection and a site assessment under the Superfund Program.

The RCRA Inspection revealed that numerous fluorescent lamps were accumulated on-site, prior to treatment in a mobile treatment unit, as described above. Currently, U.S. EPA is evaluating Jim Nayzium's compliance with Subtitle C of RCRA, with respect these operations. In particular, U.S. EPA is evaluating whether Jim Nayzium requires a RCRA Permit to perform these operations, which Jim Nayzium currently does not possess. In support of these efforts, U.S. EPA desires to determine if any of the waste bulbs received at the Jim Nayzium facility possess the toxicity characteristic for mercury.

1.2 PURPOSE OF THE STUDY

The purpose of this sampling and analyses is to determine whether or not (FILL IN YOUR HYPOTHESIS or purpose – here's an example: any of the lamps stored at Jim Nayzium possess the toxicity characteristic of mercury.

1.3 SAMPLING AREA

(IN THIS SECTION, DEFINE YOUR STUDY BOUNDARIES...HERE's an EXAMPLE) U.S. EPA will collect samples of fluorescent waste lamps present inside of the facility. If trailers containing lamps are present outdoors at the time of the inspection, the sampling team may elect to collect samples from those areas as well. The exact lamps to be sampled will be determined at the time of the sampling event.

It is U.S. EPA's intention to collect samples of different types of fluorescent lamps at the facility that have the potential to contain mercury. U.S. EPA will attempt to collect several samples of the different types of lamp according to manufacturer (example given, G.E., Phillips, Sylvania, etc.) and serial number. U.S. EPA will rely on the markings on each lamp in determining different samples to collect. U.S. EPA will also attempt to collect several samples (at least 3 to 5) of each type of lamp collected.

Since fluorescent bulbs appear to constitute the majority of lamp type stored at the facility, the field team will likely focus on those lamps in its sampling efforts. However, U.S. EPA may elect to sample other types of lamps (e.g. HID, U-Shaped) if present at the time of the sampling.

It is expected that each lamp will constitute a single sample for analysis.

1.4 FIELD SAMPLING AND ANALYSIS PLAN ORGANIZATION

This SAP presents the methods used to conduct the field investigation, document the field activities, analyze the samples, and ensure the health and safety of the field team during sampling activities. Section 2 discusses field methods for sample collection and Section 3 describes the documentation and reporting requirements for the project. Section 4 refers to the laboratory procedures and analyses and Section 5 discusses the health and safety measures that will be followed by the Project Team Members in the field.

1.5 PROJECT TEAM

The project team is as follows: FILL IN NAMES

NAME AND SECTION Project Manager, U.S. EPA, Region 5, Chicago NAME AND SECTION, LCD, Assigned QA Contact, U.S. EPA, Region 5, Chicago NAME AND SECTION, LCD, Project Assistant, U.S. EPA, Region 5, Chicago Brian P. Freeman, Currently LCD/CRL Coordinator, U.S. EPA, Region 5, Chicago Marilyn Jupp, Currently CRL QA Coordinator, U.S. EPA, Region 5, Chicago

2. SAMPLING AND ANALYSIS

2.1 CONTAMINANTS OF POTENTIAL CONCERN (FILL IN YOURS)

HERE IS AN EXAMPLE: Waste lamps will be collected and analyzed for mercury according to Toxicity Characteristic Leaching Procedure (TCLP). The analytical methods to be followed are listed below.

- Toxicity Characteristics Leaching Procedure: SW-846 1311 (CRL modified SOP).
- Inductively Coupled Plasma Atomic Emission Spectrometry: SW-846 6010B (CRL modified SOP).

The TCLP will be performed on all samples and the resulting extract will be analyzed for mercury using Inductively Coupled Plasma - Atomic Emission Spectrometry.

2.2 PROPOSED SAMPLING LOCATIONS (ATTACH A SITE MAP AND DESCRIBE YOUR LOCATIONS...Here is an example)

Waste lamps will be sampled from inside of the single story building where Jim Nayzium performs its operations. The sampling team may elect to collect waste lamps stored in trailers located outdoors at the facility if present. The exact lamps to be sampled will be determined at the time of the sampling event. The sampling team will rely on the manufacturer's markings on the lamps to collect a variety of fluorescent lamps present at the facility as they vary according to manufacturer and type. The sampling team may elect to collect other lamps (i.e. non-fluorescent) if present as well.

No special sampling methods are necessary for this project. The sampling team will carefully handle lamps (to prevent breakage) and place them in plastic bags. Bubble rap will be used to rap the bulbs to assist in transport. If feasible, the lamps will be placed in cardboard boxes for additional protection from breakage during transport.

2.3 SAMPLE DESIGNATION AND PROCESSING

A unique log number is assigned to each sample by the Project Manager assigned to this project. These log numbers are then recorded by the sampling team on sample tags, in the field log books, on the chain of custody sheets, and on appropriate laboratory data sheets.

ENTER TYPE OF SAMPLE (Each lamp) will constitute its own sample, and sample tags will be attached to each lamp. The lamps will then be placed in plastic bags. Bubble wrap will be used to surround each lamp to protect it from breakage. All samples will be labeled and identified in accordance with section 3.1.

2.4 EQUIPMENT DECONTAMINATION ENTER IF REQUIRED

No special equipment will be used during the sampling. Therefore, equipment decontamination is not anticipated.

2.5 CONTAMINATED EQUIPMENT MANAGEMENT

Disposable equipment will be used during the sampling. Therefore, equipment decontamination is not anticipated. The U.S. EPA Project Team Members will use their judgment in determining if they have generated any contaminated objects or materials during their sampling activities. Any contaminated materials will be placed in a large trash bag and transported back to **CRL** for proper management or, with consultation of Jim Nayzium, will be disposed of with Jim Nayzium's solid/hazardous waste.

2.6 SAMPLE DOCUMENTATION AND CHAIN OF CUSTODY

Chain-of-custody forms, sample labels, custody seals, and other sample documents will be completed as specified in the Quality Assurance Project Plan (QAPP). Copies of the chain-of-custody forms will be retained with the project files. The sample team or any individual performing a particular sampling activity is required to maintain a field logbook. These field logbooks will be bound, and contain entries of investigation operations as the activities proceed. The logbooks are expected to be maintained by the Project Manager or his designee.

3. PROJECT DOCUMENTATION, SAMPLING, AND REPORTING

3.1 PROJECT DOCUMENTATION

The primary types of documentation that will be used for this project include field logbooks, photographs, photo logs, sample log forms, and sample tracking forms. The field logbooks are vital for documenting all on-site activities. Photo documentation will be used to provide an accurate account of the material sampled, sample locations, and environmental conditions. Sample log forms are used to summarize data collected for various sample locations. The field logbooks are used to document any modifications made to the original project plans during field activities. Sample tracking forms include the chain-of-custody form, sample labels (or tags), and custody seals. The chain-of-custody form is used to track sample custody, which is an important aspect of field investigation activities that documents the proper handling and integrity of the samples. Sample labels are used to provide essential information and identification for all samples collected during field activities. Custody seals are used on all sample shipments to detect any tampering that may have occurred during transport or shipment. A description of each of these documentation methods is provided in the following sections.

3.1.1 Field Logbooks

The field logbooks will be used to document all field sampling activities performed at the project site. The logbooks will contain the date, time, and description of all field activities performed; names of personnel; weather conditions; the names of visitors to the site; areas where photographs were taken; and any other data pertinent to the project. The field logbooks will also contain all sample collection and identification information and a drawing of the area sampled, along with the approximate location of where each sample was taken. The sampling information will be transferred to sample log forms when the sampler returns to the office. The logbook is

the official, legal record of site activities, and will serve as the key to sample designations and locations, and will include the date, time, site/sample location, sample identification number, sample matrix, how the sample was collected, any comments, and the sampler's name.

Each page of the field logbook will be numbered, dated, and signed by the author. The logbooks will be sturdy, preferably weatherproof, and bound to prevent the removal of pages. All writing will be done in waterproof, black, permanent ink. No pages may be removed from the field logbooks for any reason. Blank pages, if any, will be marked "page intentionally left blank." Any mistakes will be crossed out with a single line, initialed, and dated. If multiple logbooks are used, they will be numbered sequentially.

3.1.2 Photo Documentation

Photographs will be taken of the total sample area and of each sample. These photos will help identify the location and will provide an accurate visual record of the material being sampled. All photographs taken will be identified in the field logbooks (preferably in a separate section of the book set aside for that purpose). Photographic logs will contain, at a minimum, the film roll number, the photo number, the date, the time, the name of the photographer, and a description of the image in the photograph.

3.1.3 Sample Collection Information Form

Sampling logs and collection forms will be used to document site and sample characteristic data, which should agree with the information recorded in the field logbooks. Field personnel are required to fill out one sample log form for each sample collected. These forms will be stored in the project file. A copy of these forms will also be included in the final data report and other documents, as appropriate. At a minimum, the log for each sample will contain the sample number, the date and time of sample collection, and a description of the sampling site, as well as the physical characteristics of the sample, the name of the sampler(s) and the name of the person recording the observations.

3.1.4 Field Change Procedure

When in the field, it may be necessary to deviate from the procedures outlined in this plan. It will ultimately be the responsibility of the Project Manager to decide when such changes are to be made. When it becomes necessary to modify a program or task, the changes will be documented in the field logbook. All field changes will be numbered consecutively starting with the number 001.

3.1.5 Sample Tracking Forms

Sample tracking is an important aspect of field investigation activities, as it documents the proper handling and integrity of the samples. Sample tracking forms to be used for the project will include chain-of-custody forms, sample labels, custody seals, and sample summary logs.

3.1.6 Chain-of-Custody Form

Internal laboratory records will document custody of the sample from the time it is received in the lab through its final disposition. The chain-of-custody form will be filled out after the samples have been collected and will be double-checked prior to the transport of the samples to the laboratory. At a minimum, the chain-of-custody form will contain the following information:

- Name of project
- Names of samplers/processing personnel
- Sample identification numbers
- Sampling date
- Sampling time
- Number and type of containers per sample
- Analysis requested

3.2 SAMPLING DOCUMENTATION

The following sections describe documentation with sampling and handling procedures.

3.2.1 Sample Labels

Each lamp collected will be clearly labeled with a handwritten Region 5 sample tag. The tag will be attached to the lamp itself. Waterproof black ink will be used to mark the tag. Sample labels will contain the following information:

- Sample identification numbers
- Sample date
- Sample time
- Preservation used, if any
- Analysis requested
- Initials of samplers/processors

Information on the sample label must match the information on the chain-of-custody form and in the field logbook for each sample.

3.2.2 Custody Seals

Custody seals will be used on the (vessels – fill in type of container) containing the samples. If coolers are used to aid in transport, custody seals will be attached to each cooler to detect any tampering during shipment. The seal numbers of each lamp will be recorded on the chain-of-custody form.

3.2.3 Sample Summary Log

Sample summary logs will be maintained by the Assigned QA Contact and used to keep track of all phases of the sampling and analysis process for all individual samples. The summary sample logs will include sample collection dates, sample delivery dates, and dates analytical results are received, along with any other relevant information.

3.2.4 Sample Custody/Tracking Procedures

The samples collected must be traceable from the time they are collected until they or their derived data are used in the final report. In general, the following provisions apply to sample handling:

- The Project Manager will be responsible for the care and custody of the samples collected until they are properly transferred or dispatched to the laboratory.
- All appropriate documentation forms will be used, including sample labels, chain-of-custody forms, sample logs and any other appropriate forms. Documentation will be completed neatly using waterproof, black ink.
- When transferring possession of samples, the individuals relinquishing and receiving them will sign, date, and note the time on the chain-of-custody form.
- Samples will be packed in plastic bags, each bag will be taped shut and sealed with an EPA custody seal. The seal number will be recorded on the chain-of-custody form. The bagged samples may be placed in cardboard boxes with bubble wrap to prevent damage of the lamps in transit. The cardboard boxes will be securely sealed with packing tape.
- A copy of the chain-of-custody form will be retained by the Project Manager for inclusion in project records.

All samples will be transported to the CRL by the Project Team and hand delivered to the laboratory.

3.3 REPORTING

Reporting for this project includes laboratory reports and the final report. CRL will prepare all reporting for laboratory activities.

3.3.1 Laboratory Reports

Final written laboratory reports will be required for chemical analyses. A laboratory report will be prepared by CRL for all laboratory procedures. Final written laboratory reports and data deliverables should contain the following, as applicable based on the method applied:

- Case narrative
- Identification of all protocols
- Summary results of initial and continuing calibration
- Method and instrument blanks
- All field sample and field QA/QC sample results
- Supporting raw data and spectra
- Supporting sample tracking information (e.g. shipping forms, chain-of-custody forms)
- Supporting documentation on any corrective actions

Initial calibration information must include concentrations of each standard analyzed, response factors for each analyte at each standard concentration, relative standard deviation (RSD) (or correlation coefficient for metals analytes) and over all standards for individual analytes. The RSD control limit range must also be indicated in the initial calibration summary data.

Continuing calibration information must include the response factor for each analyte, and the calculated percent difference as compared to initial calibration. Control limits for each analyte must also be indicated on each continuing calibration summary data sheet.

Method blank and field sample data pages must indicate the method reporting limit and the dilution factor. Surrogate reporting forms must list control limits for surrogate recovery. Spike reporting forms (blank and matrix spikes) must indicate spike percent recovery and relative percent difference control limits (if spikes are analyzed in duplicate).

Documentation of detection limits (detection limit studies) and results of performance evaluation samples (supplied by regulatory agencies or purchased from certified vendors) are not required for the data deliverable. However, these records must be supplied upon request. Total measurement error determination for field duplicate samples will be calculated. Electronic data deliverables will also be required.

3.3.2 Quality Assurance Report

No separate Quality Assurance Report is expected for this project. The final report will include a section on quality assurance. The Project Manager will prepare this section based upon activities involved with the field sampling and review of the CRL laboratory analytical data. The laboratory quality assurance/quality control (QA/QC) reports and any data package validation reports will be incorporated into the QA section by reference. This section will identify any field and laboratory activities that deviated from the approved sampling plan and the referenced protocols and will make a statement regarding the overall validity of the data collected.

3.3.3 Final Project Report

A final written report will be prepared documenting all activities associated with collection, compositing, transportation of samples and chemical and physical analysis of samples. The chemical and physical laboratory reports (or appropriate summaries) will be included as appendices. At a minimum, the following will be included in the final report:

- Brief description of the project and its objectives
- Type of sampling equipment used
- Identification and description of protocols used during sampling and testing and an explanation of any deviations from the sampling plan protocols
- Description or summary of sampling and compositing procedures
- Descriptions of each sample (i.e., sample logs)
- Summary of methods used to locate the sampling positions and a discussion of the position accuracy
- A plan view of the project showing the actual sampling locations
- Summary of all test results and data (hard copy and electronic)
- QA

In addition to the items listed above, the final report will include an electronic file of sample location information (i.e., sample ID, sample type, coordinates and sample data).

4. LABORATORY ANALYSIS

The laboratory procedures associated with physical and chemical testing applicable to this project can be found in appendixes B and C of the QAPP. FILL IN ANALYTICAL LAB METHOD will be performed on all samples.

5. HEALTH AND SAFETY PLAN

This section describes the health and safety procedures which will be used for the project.

Standard safety practices as outlined in the EPA manual Safety and Health in EPA Field Activities will be followed during this survey.

For sampling activities, the field personnel will need to use the following PPE:

- Cold weather gear as appropriate to conditions
- Disposable rubber/latex or nitrile gloves
- Safety glasses with side shield
- full face respirator (if deemed necessary based on site conditions)
- Steel-toed safety boots

The following telephone numbers are for emergency services:

Police, Fire Department, Ambulance: 911

The following hospital will be used in case of an emergency:

FILL IN HOSPITAL, LOCATION, and PHONE NUMBER

LAND AND CHEMICALS DIVISION GENERIC QUALITY ASSURANCE PROJECT PLAN

For Field Sampling Events

Facility Name
Address
City State Zip
RCRIS ID ILD 000 123 456

DATE

A1. Approvais	
PREPARED BY:	
	Name of Preparer of Site-Specific QAPP
	Land and Chemicals Division, U.S. EPA, Region 5
APPROVED BY:	
	Assigned QA Contact
	Land and Chemicals Division, U.S. EPA Region 5
APPROVED BY:	
	Section Chief Responsible for Sampling Event
	Land and Chemicals Division, U.S. EPA Region 5
APPROVED BY:	
	Branch Chief Responsible for Sampling Event
	Land and Chemicals Division, U.S. EPA, Region 5

Prologue

A QAPP is designed to focus primarily on:

- 1) the Data Quality Objectives for the event, (the end result of what the data will be used for),
- 2) the boundaries of the sampling event (the population that the samples taken herein represent)
- 3) the acceptance or rejection of the problem posed in the event (the hypothesis)

The QAPP also outlines the analytical methods and QA/QC procedures that are used to analyze the samples and manage the data. The QAPP should include the organization and responsibilities of project laboratory and data assessment personnel; QA objectives; sample receipt, handling, custody, and holding time requirements; analytical procedures, equipment preventive maintenance, calibration, internal quality control procedures, and performance/system audits; data reduction, review, and reporting; and data assessment, data usability, and DQO reconciliation. Additional information may be obtained from EPA QA/R-5, EPA QA/G-5, and other references. **RED FONT AREAS ARE TO BE FILLED IN DURING QAPP DEVELOPMENT**

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100 miles (100 miles (LIST OF ACRONYMS
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CRL	Central Regional Laboratory, U.S. EPA Region 5
DQO	Data Quality Objective
FSP	Field Sampling Plan
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SA	amount of spike or surrogate added
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SSR	spiked or surrogate sample result
SR	unspiked sample result
U.S. EPA	U.S. Environmental Protection Agency

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A3. DISTRIBUTION LIST

The management, quality assurance, laboratory and field responsibilities are as follows for the United States Environmental Protection Agency (U.S. EPA) sampling event:

- U.S. EPA LCD Project Manager XXXXXXXXXXXX (fill in)
- U.S. EPA LCD Project Assistant YYYYYYYYYYYYYYYY (fill in)
- U.S. EPA LCD QA Contact ZZZZZZZZZZZZ (fill in)
- U.S. EPA LCD/CRL Coordinator/REPA COR (Currently) Brian P. Freeman
- U.S. EPA CRL OA Coordinator (Currently) Marilyn Jupp (fill in another lab if required)

A4. PROJECT/TASK ORGANIZATION

A4.1 EPA Project Management

A4.1.1 EPA Project Manager

The EPA Project Manager is XXXXXXX, and is responsible for all project activities, and will coordinate field activities.

A4.1.2 EPA Project Assistant

The EPA Project Assistant (if required) is YYYYYYYY, and is responsible for assisting the EPA Project Manager in all project activities, and will assist in coordinating field activities.

A4.2 Quality Assurance Responsibilities

A4.2.1 EPA Quality Assurance Coordinator

The EPA Quality Assurance Contact is ZZZZZZZ, and is responsible for review of the QAPP.

A4.2.2 EPA CRL Analytical and QA Responsibilities

The Central Regional Laboratory (CRL) (Fill in another Lab if Applicable) will be responsible for conducting analyses, ensuring that the CRL quality assurance program is implemented, and preparing a report of CRL analyses and quality assurance for the Project Manager. The CRL QA coordinator will ensure that the appropriate standard operating procedures (SOPs) are followed, and that a complete data package is delivered to the EPA Project Manager in the agreed turn around time with CRL.

A4.2.3 U.S. EPA Project Manager Responsibilities

The U.S. EPA Project Manager is ultimately responsible for all activities at the site, and coordinating with CRL to complete all proper analyses.

In addition, he or she is responsible for the following:

- preparation of the sampling plan based on site knowledge
- performing and oversight of sample collection activities
- ensuring that the sampling plan and QAPP are followed by the field team

A4.2.4 U.S. EPA Field Team Responsibilities

The U.S. EPA Field Team is responsible for the following:

- sample collection
- photo documentation of the sampling event
- completely recording the details of the sampling event in a log book
- ensuring the QAPP and sampling/safety plans are implemented
- delivering the environmental samples from the field to CRL
- preparing a report of field activities and field quality assurance
- ensuring that chain-of-custody procedures are followed from time of sample collection to arrival of the sample at the laboratory

A4.3 Laboratory Responsibilities (EPA CRL)

CRL (other lab) is responsible for analysis (USING ANALYTICAL METHODS FILLED IN HERE) to determine the concentration of (contaminants) in the sample. The samples will be analyzed for mercury content.

A complete data package for each analysis shall be composed, and adherence to all CRL analytical methods and procedures shall be required.

A4.4 Field Responsibilities

The U.S. EPA Field Team will be responsible for the sample collection and preparation of the samples, initiating and maintaining chain-of-custody, and delivering all samples to CRL.(other lab)

A5. PROBLEM DEFINITION/BACKGROUND

A5.1 Site History

A5.2 Sampling Area

A5.3 Project Purpose

A6. PROJECT/TASK DESCRIPTION

A6.1 Existing Information /

A6.2 Task to be Performed

A7. QUALITY OBJECTIVES AND CRITERIA

Project Data Quality Objectives (DQOs) provide criteria against which project performance can be evaluated to determine whether overall project QA objectives are met.

Problem definition.

Decision to be made.

Inputs to the Decision. Inputs include the following: (FILL IN DECISION INPUTS).

Mu

- Analytical data from the samples collected during the inspection.
- EXAMPLE : Regulatory concentration for mercury at 40 CFR § 261.24.
- EXAMPLE: Definition of a hazardous waste as defined in 40 CFR § 261.3.
- Analytical method reporting limits.

Study Boundaries.

Decision Rule. (FILL IN)

(ie. Concentrations of an analyte greater than 5 parts per million reveals a violation), etc.

Limits on Decision Errors. The decision rules will be applied using valid data derived from the samples. Samples will be selected to be representative of existing conditions. Data quality requirements specific to the method for precision and accuracy will be used to determine the validity or usability of the data. The method precision and accuracy requirements are defined in the individual laboratory procedures and the laboratory QAPP.

Optimize the Design. The locations of possible sources, technical characteristics of the contaminants, and the media in which they are present have been used to determine a cost-effective design for the sample collection. This study will be performed to minimize the number and type of samples collected while supplying sufficient data upon which to apply the decision rules.

A7.1 Project Schedule/Time Table

The time table for this project is as follows:

Table 1. Estimated Project Schedule

Activity	Date
QAPP/Sampling and Safety Plan Approved	DATE
Field Sampling	DATE
Sample Analysis	Within X DAYS after sampling completion.
Data Verification	Within Y days after analysis.
Draft Report	Within Z days after data verification.
Final Report	Within ZZ days of draft report.

A8. SPECIAL TRAINING/CERTIFICATION

The U.S. EPA Sampling Team members and the CRL analytical staff possess the required training and qualifications to perform their functions for this project. No special training is anticipated for this project.

A9. DOCUMENTS AND RECORDS

The Quality Management Plan (QMP), Land and Chemicals Division, Region 5, May 2008, was used for preparation of this QAPP. Other documents that will be produced as a result of this project include a field notebook, an analytical report generated by CRL, and a Final Report generated by the Project Manager.

GROUP B. DATA GENERATION AND ACQUISITION ELEMENTS

B1. SAMPLING PROCESS DESIGN (EXPERIMENTAL DESIGN)

Complete sampling procedures may be found in the companion sampling plan. See the site-specific SAP for this project (Appendix A).

B2. SAMPLING METHODS

See the SAP for this project. Appendix A.

B3. SAMPLE HANDLING AND CUSTODY

B3.1 Field Custody Procedures

The environmental samples will be maintained under custody at all times from collection until delivery to CRL. The CRL will maintain the samples under custody through analyses. The custody procedures to be followed mimic the EPA Samplers Guide to the CLP program EPA/540/R-96/032). CRL is the evidence file custodian. Complete field custody procedures to be used are also found in the SAP for this project.

B3.2 Laboratory Custody Procedures

CRL custody procedures for sample receiving and log-in, sample storage and numbering, tracking during sample preparation and analysis, and storage of data are described in the CRL QMP.

B3.3 Final Evidence File Procedures

All hard copy analytical data and chain-of-custody records shall be retained by the CRL following the analyses, with one copy provided to the Project Manager. The CRL shall review the data and provide a verification report. The hard copy analytical data, custody records and verification report shall be maintained in the CRL's secure, limited-access data storage area. This portion of the evidence file shall be stored at the CRL for a period of three years after which the records shall be offered to the Project Manager prior to permanent transfer to the Federal Records Center in Chicago. Each laboratory shall maintain all raw analytical data on magnetic media whenever possible for a period specified in their laboratory QAPP.

The Project Manager or his designee shall maintain the portion of the final evidence file including: field logbooks, photographs, drawings, field QA/QC reports, data assessment report, and final project report.

B4. ANALYTICAL METHODS

B4.1 Field Analytical and Measurement Procedures

Fill in as applicable

B4.2 Laboratory Analytical and Measurement Procedures

CRL Standard Operating Procedures (SOPs) will be used for all analytical procedures on this project. Appendix B and C contain all the analytical methods used in this project. (change this area if another laboratory is used, and include SOPs/methods in the appendices)

The methods included are: (FILL IN) *Examples*

• Toxicity Characteristics Leaching Procedure: SW-846 1311 (CRL modified SOP).

Inductively Coupled Plasma - Atomic Emission Spectrometry: SW-846 6010B (CRL modified SOP).

B5. QUALITY CONTROL

B5.1 Field Quality Control Checks

The primary quality control (QC) checks will be the collection of a sufficient amount of sample to assure adherence to the SAP. The sampling procedures consist only of collecting whole, intact lamps, and placing them in containers for safe transport to the laboratory. No special equipment will be used that could contaminate the lamps.

B5.2 Laboratory Quality Control Checks

These QC checks will primarily include initial and continuing calibrations, QC check samples, method blanks, and laboratory duplicates.

The QC limits are given in each method or procedure.

B5.3 Quality Assurance Objectives

B5.3.1 PRECISION

Precision is the degree to which data generated from replicate or repetitive measurements differ. Precision may be stated in terms of standard deviation, range, relative percent difference and relative range.

B5.3.1.1 Field Precision

FILL IN IF REQUIRED.

B5.3.1.2 Laboratory Precision (Change, if Required)

Laboratory precision is determined using laboratory analytical duplicates. Precision is measured by the relative percentage difference in concentration between two samples. The precision objective for this event is for duplicates to match within 20% relative difference.

B5.3.2 ACCURACY

Accuracy is defined as the difference between a reported value and a known or accepted value.

B5.3.2.1 Field Accuracy (CHANGE, if REQUIRED)

No equipment (rinsate) blanks will be required.

B5.3.2.2 Laboratory Accuracy

Laboratory accuracy may be assessed through the use of spiked samples, check standards, and initial/continuing calibrations. If a matrix spike and matrix spike duplicate cannot be prepared to determine accuracy then the laboratory must use a laboratory blank and provide an explanation.

B5.3.3 COMPLETENESS

Completeness is defined as the measure of the percentage of the amount valid, acceptable data generated, relative to the amount of data that was expected to be collected. For this project, completeness objective is 100%.

B5.3.4 REPRESENTATIVENESS

B5.3.5 COMPARABILITY

All data collected during this project is intended to be comparable for all sampling locations by consistently using step wise sampling and analytical procedures.

B6. INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

B6.1 Field Instrument and Preventative Maintenance (FILL IN IF REQUIRED)

B6.2 Laboratory Instrument and Preventative Maintenance

The Laboratory shall follow standard, established procedures. Any deviation should be cleared through the EPA quality assurance coordinator prior to analysis.

B7. INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

B7.1 Field Instrument Calibration (FILL IN IF REQUIRED)

Not applicable for this project.

B7.2 Laboratory Instrument Calibration

Calibration procedures for laboratory instruments will consist of initial calibration, calibration verification and continuing calibration verification. For a description of the calibration procedures for a specific laboratory instrument, refer to the procedures and methods provided by CRL for running the required analyses.

CRL will maintain a sample logbook for each instrument which will contain at least, but not limited to the following information: instrument identification, serial number, date of calibration, analyst, calibration solutions run and the samples associated with these calibrations.

B8. INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

B9. NON-DIRECT MEASUREMENTS

Not applicable.

B10. DATA MANAGEMENT

No separate quality assurance reports to management are expected for this project. The final project report shall include a quality assurance section that shall summarize the verification of field and laboratory data, any field or lab QA problems, field and lab audit results and proposed and/or implemented field corrective actions.

The CRL QA coordinator will ensure that a complete data package is delivered to the EPA Project Manager for verification in the agreed turn around time for CRL.

See Group B, Section B3, B3.3, Final Evidence File Procedures for data management procedures.

GROUP C. ASSESSMENT AND OVERSIGHT ELEMENTS

C1. ASSESSMENTS AND RESPONSE ACTIONS

The Project QA Coordinator has the responsibility for conducting Performance and System Audits, as needed.

C1.1 Field Performance and Systems Audits

U.S. EPA Field Audits will not be required for this project, since U.S. EPA staff will be conducting the field sampling.

C1.2 Laboratory Performance and Systems Audits

No project-specific laboratory audits by the U.S. EPA of the CRL are expected prior to the initiation of sampling. CRL has undergone several quality systems audits prior to this project. (If audit or Performance Evaluation Testing of another lab is required, fill in)

C1.3 Assessing Data Precision, Accuracy and Completeness

C1.3.1 PRECISION ASSESSMENT

Precision shall be assessed using relative percent difference (RPD) calculated as:

RPD =
$$D1 - D2$$
 x 100% where, D1= investigative sample result (D1 + D2)/2 D2= duplicate sample result

C1.3.2 ACCURACY ASSESSMENT

Accuracy may be assessed using % recovery of spiked or surrogate standard sample results calculated as:

% Recovery =
$$(SSR - SR)$$
 x 100%
SA

where, SSR = Spiked or surrogate sample result

SR = Unspiked sample result

SA = Amount of spike or surrogate added

C1.3.3 COMPLETENESS ASSESSMENT

Completeness is defined as the percentage of the amount of valid data obtained relative to the amount of data which was expected to be collected.

Completeness = Amount of valid data obtained x 100% Amount of data expected to be collected.

C1.4 CORRECTIVE ACTION

The need for corrective action during the project may be determined at several points: during field activities, during lab activities and during data validation & assessment. All corrective action procedures will be reviewed with the assigned EPA QA Contact and documented in the final report.

C1.4.1 Field Corrective Action

Corrective action in the field may be necessary due to quality assurance problems during sampling that were not anticipated in this QAPP. In general, the need for corrective action will be identified by the field team leader. Corrective action should be approved by the assigned EPA QA Contact prior to initiation. The field team leader may consult other technical staff (i.e. CRL, risk assessors, senior geologists, etc.) regarding potential corrective actions where data quality is an issue.

C2. Reports to Management

The final project report shall include a QA section that shall summarize the verification of field and laboratory data, any field or laboratory QA problems, field and laboratory audit results and

proposed and/or implemented field corrective actions. The report will also discuss the field activities and analytical results. Details on the reporting requirements for this project can be found in the SAP (Appendix A).

GROUP D. DATA VALIDATION AND USABILITY ELEMENTS

D1. DATA REVIEW, VERIFICATION, AND VALIDATION

The EPA Project Manager will record all qualitative descriptions, diagrams of the sample area, sample locations, and the name of the EPA Field Team Member collecting each sample in a log book. A photo log of the sampling event will also be produced.

D2. VERIFICATION AND VALIDATION METHODS

D2.1 Laboratory Data Reduction (FILL IN OR CHANGE)

CRL data reduction procedures for the analyses are specified in each section of the CRL's SOPs.

D2.2 Laboratory Data Verification (FILL IN OR CHANGE)

CRL data verification procedures for the analyses are specified in each section of the CRL's SOPs.

D2.3 Laboratory Data Validation

The Project manager will rely on the information contained in the data package and laboratory report, as provided by the CRL, for validation of the data generated in this project.

D2.4 Laboratory Data Reporting

The CRL shall follow standard, established procedures. Any deviation from the procedures should be cleared through the U.S. EPA QA contact before execution.

D3. RECONCILIATION WITH USER REQUIREMENTS

D3.1 Laboratory Corrective Action

All laboratories will follow standard, established procedures. Any deviation from standard procedures should be cleared through the U.S. EPA QA contact before execution.

D3.2 Corrective Action During Data Verification and Data Assessment

The need for corrective action may be identified during the data verification process conducted by the CRL. If the corrective action requires re-analyzing the sample, the laboratory QA coordinators in conjunction with analysts shall determine whether the samples are within holding time and whether sufficient sample remains for re-analysis.

If data are determined to be unusable, results are estimated quantitatively or the samples cannot be re-analyzed, the EPA QA Contact and the field team leader will be advised of the situation by the CRL. The U.S. EPA Project Manager can then determine the feasibility of re-sampling or accepting the limitations of the data.

Review Comments Groundwater contaminant plume contamination

- 1. The groundwater model presented is poorly justified. Among the more major issues with the model are a) boundary conditions require justification. i.e. are the streams being used as specific heads or as specified flow boundaries? b) given the location of the plume and the principal stresses on the plume, measurements of the interactions of the stream boundaries should be given to represent these as specified heads; c) Additional head measurement points down gradient of the extraction wells should be developed before any further attempts to calibrate this model; d) episodic pumping of the irrigation wells should be included in the model.
- 2. Before modeling is done, the EPA urges the facility to produce cross-sections of the plume that trend both longitudinal and perpendicular to the general groundwater flow pattern (N-NW?). Depict all monitoring wells used to define the plume in the X-Y and, notably, Z direction. Show screening depths and include pertinent contaminant concentration data. Further, show data constraining the spatial and depth locations used to constrain the plume (i.e. < MCL values).
- 3 The reporting limit for vinyl chloride appears to be high. Report the detection limits for the analytical report. Generally, I would have expected to have seen vinyl chloride in some of the wells.
- 4. Incorporate the down gradient irrigation wells into the cross sections and model. Give description of the irrigation wells including depth, screening, if any, diameter, pumping capacity, history and strategy of their use by the sod company
- What is the potentiometric groundwater surface both with stresses (including irrigation wells), and without stresses
- 5 In regards to Section 4, the EPA believes that completing pertinent cross-sections will assist in determining the plume behavior in the vicinity of the streams to the east and north. The ground-water, surface-water interactions should, at a minimum, be assessed prior to their use as boundary conditions. The model implies the river stage is independent of the ground-water heads. If this is so, provide evidence, especially given the production and extraction pump wells currently operating in the area.
- 6 Figure 6, depicting 2 quasi-separate plume foci, will require supporting documentation, both in the form of a more accurate comprehensive ground-water flow model but, more importantly, with field evidence designed to support the modeling results.

It is premature to review the Monitored Natural Attenuation (MNA) component of the report pending more accurate, calibrated and verified modeling and plume definition using capture zone analysis etc. At a minimum, however, the facility should follow established EPA guidance in advocating MNA application at the site.



Bhooma Sundar/R5/USEPA/US

03/04/2008 12:03 PM

To

Subject Agenda Items

Scott,

Matrix, on Behalf of Central Wire submitted Ground Water Contamination Plume Evaluation (April 2007) and Ground Water modeling Report (Jan 2008) to evaluate the fate and transport of chlorinated hydrocarbons beyond the downgradient wells. Please see the attached comments on the April 2007 report which was sent to you on 10/4/07. It was our impression that the revised modeling report would address all our comments. However, the latest report from Jan 2008 failed in many aspects, an abbreviated list follows; appropriate development of a conceptual site model, proper selection and discussion of boundary conditions, discretization effort, integration of available field data into model, discussion of why a 3-dimensional finite difference model is used in a 2-dimensional manner, integration of potential Sod Farm stresses etc..

In order for USEPA to consider MNA as the selected remedy to address plume migration, Central wire should demonstrate their confidence in understanding the hydraulic environment of the local aquifer.

Our agenda will therefore focus on the following items:

- MNA as a potential remedy
- Data requirements for Plume definition
- Residential wells Future Steps
- Financial Assurance implications due to anticipated additional work



Plume Evaluation Comments.doc

I request you to submit the latest GW sampling data from the June 2007 and Dec 2008 to me before the meeting. Provision of an aerial photograph that clearly points the plume delineation, location of the adjacent residential, industrial and irrigation (SOD farm) wells before the meeting will also aid in productive discussion. Thanks.

Bhooma Sundar
Toxicologist
RCRA Corrective Action
Mail Code: DE-9J
USEPA Region 5
77, W.Jackson Blvd, Chicago, IL 60604

Tel: 312-886-1660 Fax: 312-353-4342

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Table 2-2

Significant Construction Information of Monitoring Wells at Techalloy RFI Study Techalloy Company, Inc. Union, Illinois

Well I.D.	Date Installed	Depth (bgs) ft	Screened Interval	Construction Material
MW-1	January 1990	14.0	4-14	2"-PVC
MW-2	January 1990	15,0	5-15	2".PVC
MW-3D	January 1990	115.5	104-114	2"-PVC
MW-4	January 1990	14.0	4-14	2"-PVC
MW-5	March 199()	38.5	27-37	2"-PVC
MW-5D	March 1990	90.0	74-84	2"-5.5t
MW-6	March 1990	20.0	10-20	2"-PVC
MW-7	March 1990	26.0	16-26	2"-PVC
MW-8	March 1990	26.0	16-26	2"-PVC
MW-9	March 1990	28.0	16-26	2"-PVC
MW-10	July 1992	16.0	G-16 '	2"-PVC
MW-11	July 1992	16.0	6-16	2"-PVC
MW-IIBR	August 1990	35.0	17-27	2"-PVC
OBS-W	February 1992	41.0	18-38	2"-PVC
PTW-1	February 1992	39.0	29-39	6"-PVC

bgs = below ground surface

It = fuct

PVC = Poly-Vinyl Chloride

S.St. = Stainless steel

WATER WELL CONSTRUCTION REPORT

WELL COMPLETION AND SEND TO THE APPROPRIATE HEALTH DEPARTMENT.	GEOLOGICAL AND WATER SURVEY WELL RECORD
THE CONTROL OF THE PARTY OF THE	13. Property Owner The Property Owner Well #
1. Type of Well a. Driven Well Casing diamin. Depthft.	14. Driller License #102-503289
b. Bored Well Buried Slab [] Yes [] No	15. Name of Drilling Co. The state of the Punio, 100.
Hole Diameter in. to ft.; in. to ft.; in. to ft.	16. Permit No. 6-6363 Date Issued 19/10/01
c. Drilled Well PVC casing Formation packer set at depth offt.	17 Date Drilling Started 5 (5) 1
Hole Diameter <u>se in. to se fit.</u> in. to ft. in. to ft.	18. Well SITE address 1014) Route 176 Land ID #
Type of Grout # of Bags. Grout Weight From (ft.) To (ft.) Tremic Depth (ft.)	19. Township Name Factorial Land ID #
	20. Subdivision Name Lot #
BAROLS 1 10.0 15 3 35	21, Location a. County 120 Temperature
	b. Township Range Section 70
d. Drilled Well Steel Casing Mechanically Driven [] Yes [] No	
Hole Diameter in. to ft. in. to ft. in. to ft.	e. Quarter Quarter Quarter d. Coordinates Site Elevation ft. (msl)
Type of Grout # of Bags Grout Weight From (ft.) To (ft.) Tremie Depth (ft.)	22. Casings, Liners* and Screen Information
	Diam. (in.) Material Joint Slot Size From (ft.) To (ft.)
	Diam. (in.) Material Joint Slot Size From (ft.) To (ft.)
•	
e. Well finished within [5] Unconsolidated Materials [1] Bedrock	
f. Kind of Gravel Sand Pack Grain Size/Supplier # From (ft.) To (ft.)	
1. St. 68 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	144
L	(*) (List reason for liner, type of upper and lower seals installed)
2. Well Use [2] Domestic [] Irrigation [] Commercial [] Livestock	terror roughl to more type or telem and terror some mountain
[] Monitoring [] Other	23. Water from 4 12 ve at a depth of 44 ft. to 6. a. Static water level 5 ft. below casing which is 12 in. above ground
3. Date Well Completed 2/8/02 Well Disinfected [X] Yes [No	a. Static water level 5 ft. below easing which is 12 in. above ground
Driller's estimated well yield gpm 4. Date Permanent Pump Installed 2 / 1.1 / 3.2	b. Pumping level is 20 ft. pumping 19 gpm after pumping for 2 hours
5. Pump Capacity 10 gpm Set at (depth) 10 th.	
6. Pitless Adapter Model and Manufacturer 233 1 3 3 4 2 7 7 7 7	24. Earth Materials Passed Through From (ft.) To (ft.)
7. Well Cap Type and Manufacturer 99116 175	Top Soil 0 2
8. Pressure Tank Working Cycle 12 gals. Captive Air [2] Yes [] No	, , , , , , , , , , , , , , , , , , , ,
9. Pump System Disinfected [] Yes [] No	
10. Name of Pump Company Country Sell & Dusice Inc.	
11. Pump Installer	Grave 14 56
12. License # 5	
Licensed Pump Contractor Signature	
Illinois Department of Public Health	
Division of Environmental Health	
525 W. Jefferson St.	
Springfield, IL 62761	Francisco de la companya del la companya de la comp
DO NOT write on these lines	(If dry hole, fill out log and indicate how hole was sealed.)
IMPOUNTANT NOTICE. This state appear is expressing displacement of information that is necessary to	192-003-09

accomplish the statutory purpose as outlined under Public Act 85-0863. DISCLOSURE OF THIS INFORMATION IS MANDATORY. This form has been approved by the Forms Management Center.

SEE BEVERSE SIDE FOR ADDITIONAL INFORMATION)

25. Licensed Water Well Contractor Signature

-003 09

License Number

ILLINOIS STATE GEOLOGICAL SURVEY

and a state of the		
8 cmi - Frivate Water Well	Top	Bottes
copseil ToPSeIL	_ 0	1 2
	2	4
BROWN CIAY BROWN CIAY TO SAND / GRAVE!	4	57
DECOMO BECOMY CLAY BROWN STONY Clay-	57	70
Total Bayth		76
Cawing: 5" PVC from 0' Lu 50' 5" 98 9CREEN from 50' to 54'	:	
Screen: 4' of E" diameter 20 slps	1	1
Grout: SENTONITE CHIPS from 0 to 5.		
Front: MATIVE from 8 to 54.		
Water from sand/gravel at 50' to 54'. Static level 6' below casing top which is 2' above 3L		
Purping level 7' when pumping at 10 gpm for I hours	ļ	
Permanent pump installed at 20' on March 22, 2000, with	le cenecit	į.
ा । प्राप्ता	. orbacze	· ·
Addross of well: Asme as above		1
Location pource: Location from permit	ŧ	
	*	
	f	
	,	1
		į
	1	
		1
Permit Dates Merch 16, 2000 Permit 4:	1	
COMPANY Aeller, Larry	= 1	
FARM Central Fod		
and the A M N N W We had AM & A	<u> </u>	
LOCATION 5% SW SW		
LATITUDE 12.255976 LONGITUDE 88.568318	, ,	e rene allerium ye un
COUNTY McHenry API 121113756100	29 - 44	N - 6E

Central Sod CASING - 5" PVC 0-50' SS. Seveen - 5" - 50'-54' Farm Well Seveen - 4' of 5" dia 1 zo slot

to Jack Scott

Date	Sample Location	Depth	Time Setting Screen	Time	pН	Temp	Sample Tim
2/19/07	GP-5S	191	11:03 – 11:05	13:14	7.6	52°F	13:14
2/20/07	GP-5I	57'	8:05 - 8:10	8:26	8.0	43.5°F	8:48 & 9:00
				8:32	8.1	46.3°F	
				8:40	8.1	48.7°F	
				8:48	8.1	48.7°F	
2/20/07	GP-5D	84'	9:17 – 9:30	10:00	8.1	49.5°F	10:08
***************************************				10:04	7.7	51.1°F	
				10:08	7.7	51.1°F	
2/20/07	GP-4S	27'	10:50 - 10:52	11:02	8.0	52.7°F	11:12
				11:03	7.9	53.2°F	
				11:12	7.9	53.2°F	
2/20/07	GP-4I	57'	11:25 – 11:30	11:49	7.8	51.7°F	11:59
				11:51	7.8	52.2°F	
				11:59	7.8	52.3°F	
2/20/07	GP-4D	84'	13:05 - 13:15	13:35	8.2	52.2°F	13:50
				13:40	7.8	52.2°F	
		-		13:48	7.8	52.2°F	
2/20/07	GP-6D	847	14:50 – 15:00	15:24	7.8	53.1°F	15:35
				15:27	7.7	53.0°F	
				15:35	7.7	53.0°F	-
2/21/07	GP-6S	27'	8:06 - 8:10	8:25	7.9	49.4°F	8:32
				8:28	7.8	49.6°F	
	***************************************			8:32	7.8	49,5°F	
2/21/07	GP-6I	57'	8:48 - 8:55	9:27	7.8	51.8°F	9:37
				9:29	7.7	51.9°F	
				9:31	7.6	52.0°F	
				9:37	7.6	52.0°F	
2/21/07	GP-3S	27'	10:30 - 10:35	10:52	7.9	52.7°F	11:00
				10:54	7.8	52.5°F	
				11:00	7.8	52.7°F	
2/21/07	GP-3I	57°	11:17-11:27	11:55	7.9	51.9°F	12:05
				11:58	7.8	51.4°F	
,			·	11:59	7.7	51.4°F	
				12:05	7.7	51.4°F	
2/21/06	GP-3D	843	13:35 – 13:50	14:18	8.0	52.5°F	14:30
				14:20	7.9	52.2°F	
	Ameninal Suid			14:23	7.8	51.4°F	
	· · · · · · · · · · · · · · · · · · ·			14:30	7.8	51.4°F	
2/21/07	Shop Well			15:20	7.3	51.0°F	15:20
2/21/07	GP-2D	84'	15:28 – 15:43	16:06	7.9	52.0°F	16:15
				16:08	7.8	51.8°F	
				16:15	7.8	51.8°F	
3/1/07	GP-2S	27'	9:30 - 9:32	10:15	7.7	51.7°F	10:22
				10:17	7.6	52.5°F	***
				10:22	7.6	52.5°F	Command Prints

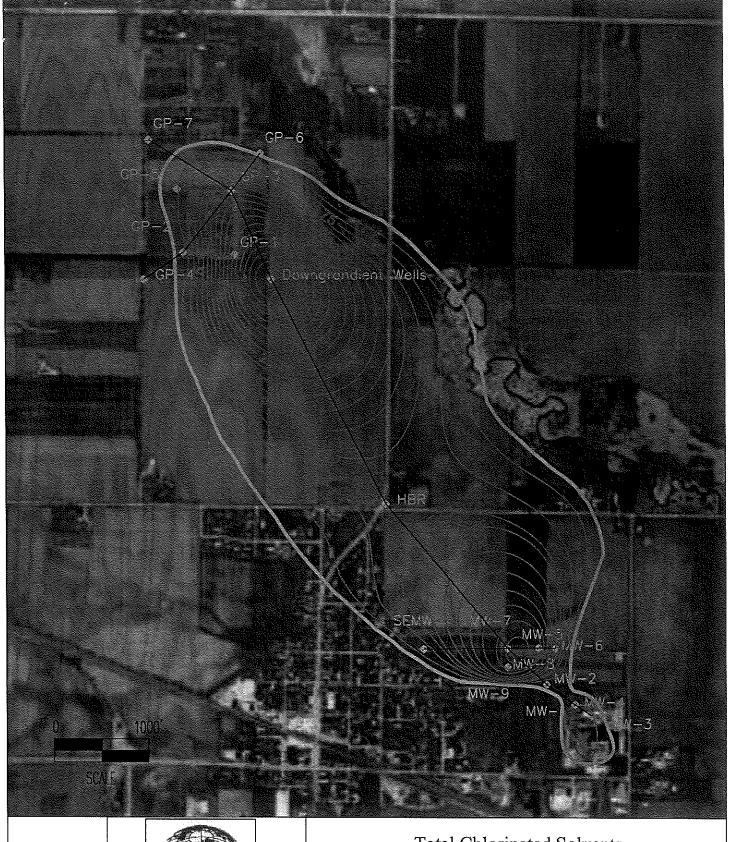
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3/1/07	GP-7S	27'	12:37 - 12:41	14:17	8.1	48.9°F	14:21
				14:19	8.0	49.5°F	
		to manuscript and desired the set of the second section is the following setting of the		14:21	8.0	49.5°F	
3/1/07	GP-71	57`	12:11 - 12:19	13:55	7.5	50.8°F	14:00
				13:57	7.4	51.4°F	
		and anticology of the state of the control of the control of the state		14:00	7.4	51.4°F	
3/1/07	GP-7D	847	11:05 - 11:18	11:40	7.8	50.5°F	11:45
				11:42	7.9	50.6°F	
				11:45	7.9	50.6°F	

Residential Well Information and High Capacity Irrigation Well Locations Union, Illinois

Owner of Residential Well	Depth of Well	Screened Interval	Address
Central Sod Well #1	Deep well- 70 Feet	40 to 70 Feet	Non-responsive
Non-responsive	Deep well - 85		
	Shallow well - 25		
	Shallow well		
	Shallow well		
	Shallow Well		
	Intermediate well 50 feet		
	Shallow well – 30 feet		
	Deep well – 90 feet		

Shallow well -10 feet to 30 feet Intermediate well -30 feet to 60 feet Deep well - 60 feet to 90 feet







Matrix Environmental Inc. 1880 W Winchester Rd Suite 111 Libertyville, IL. 60048

Total Chlorinated Solvents



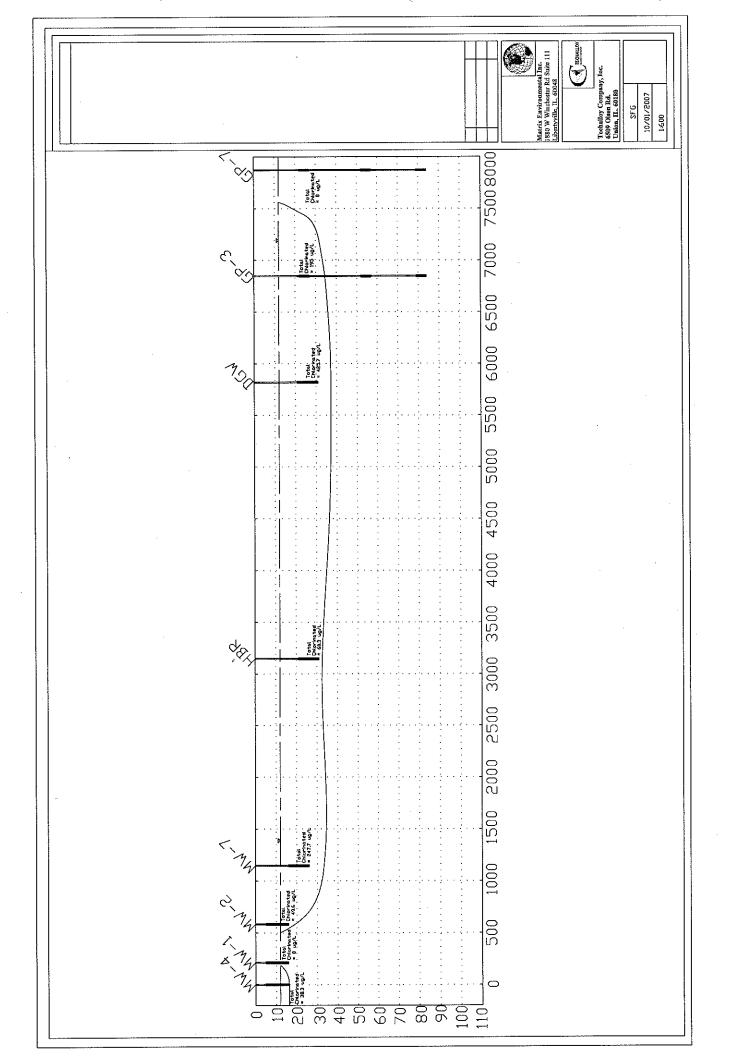
Techalloy Company, Inc. 6509 Olsen Rd. Union, IL. 60180

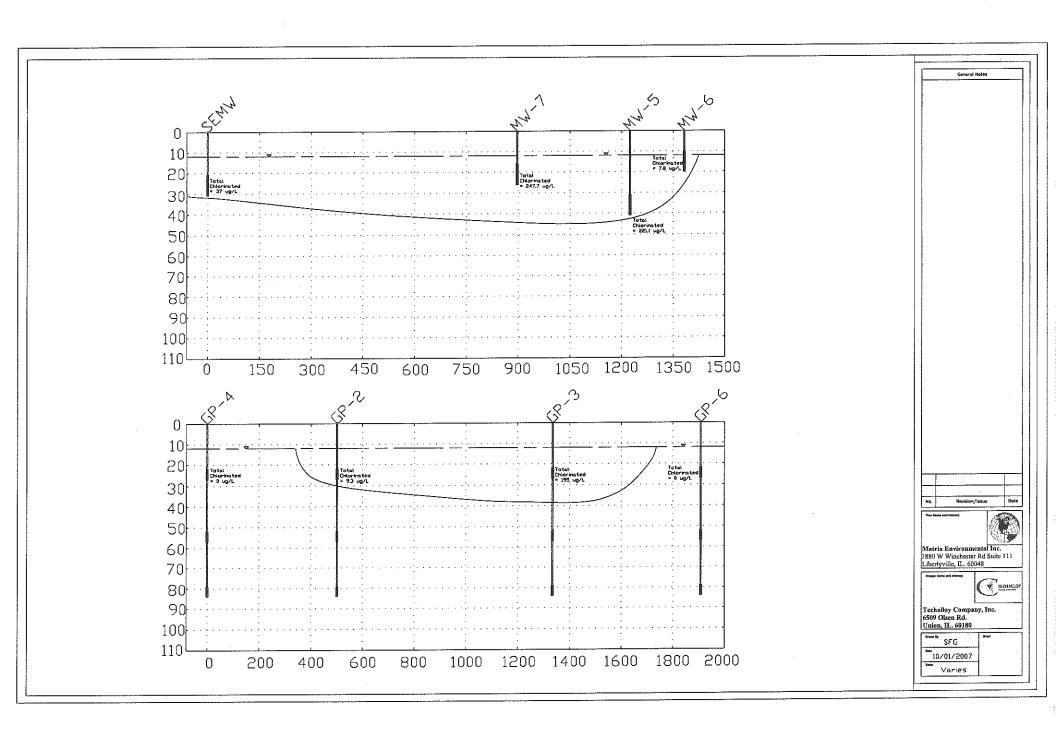
SIZE 04/13/2007

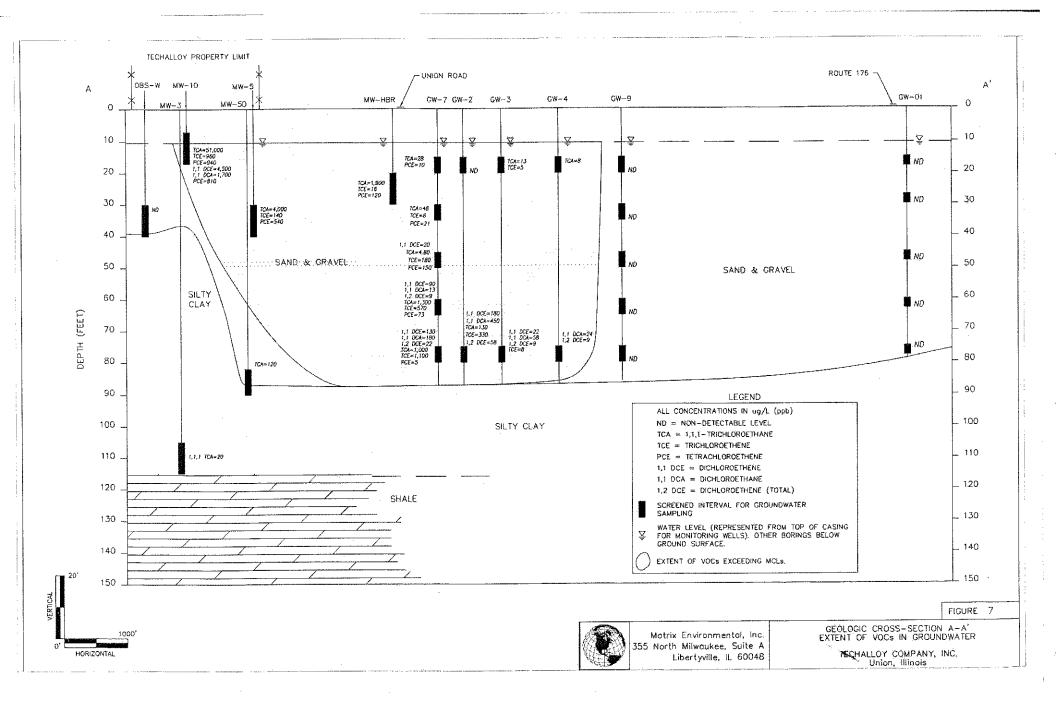
SCALE 1"=1000' Drawn By: SFG SHEET

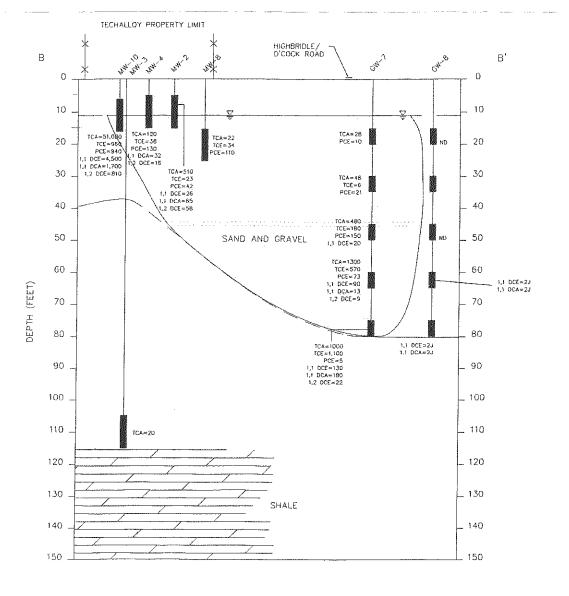
FSCM NO. DWG NO.

REV









LEGEND

ALL CONCENTRATIONS IN ug/L (ppb)

ND = NON-DETECTABLE LEVEL

TCA = 1,1,1-TRICHLOROETHANE

TCE = TRICHLOROETHENE

PCE = TETRACHLOROETHENE

1,1 DCE = DICHLOROETHENE

1,1 DCA = DICHLORGETHANE

1,2 DCE = DICHLOROETHENE (TOTAL)

SCREENED INTERVAL FOR GROUNDWATER SAMPLING

WATER LEVEL (REPRESENTED FROM TOP OF CASING FOR MONITORING WELLS). OTHER BORINGS BELOW GROUND SURFACE.

EXTENT OF VOCS EXCEEDING MCLS.

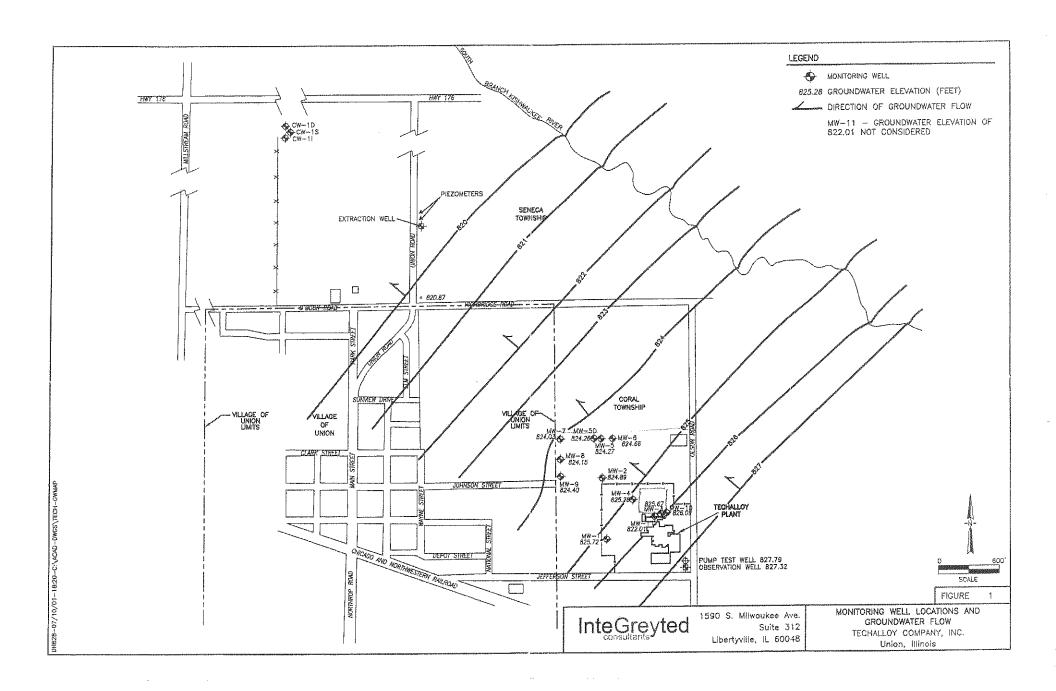


Matríx Environmental, Inc. 355 North Milwaukee, Suite A Libertyville, IL 60048 GEOLOGIC CROSS—SECTION B—B' EXTENT OF VOCS IN GROUNDWATER

FIGURE 8

TECHALLOY COMPANY, INC. Union, Illinois

1000°



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